

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

HONEYWELL INTERNATIONAL INC.
and HONEYWELL INTELLECTUAL
PROPERTIES INC.,

Plaintiffs,

v.

HAMILTON SUNDSTRAND CORP.,

Defendant.

C.A. No. 99-309-GMS

HONEYWELL'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW

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HONEYWELL'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW

Honeywell respectfully submits these Proposed Findings of Fact and Conclusions of Law:¹

The issue before this Court on Remand is whether Honeywell can overcome the presumption that it is estopped from recapturing equivalents to the "inlet guide vane limitation." *Honeywell Int'l Inc. v. Hamilton Sundstrand Corp.*, 370 F.3d 1131, 1134, 1144 (Fed. Cir. 2004). As set forth below, Honeywell has successfully rebutted the presumption of prosecution history estoppel for two independent reasons established by the Supreme Court in *Festo*. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722 (2002). First, the Sundstrand surge control system found by a jury to be an infringing equivalent to the Honeywell patents after a

¹ Honeywell is filing herewith an Appendix of supporting materials that includes the relevant pages of all exhibits, testimony and filings cited to herein. Because the parties provided the Court on April 7, 2006 with a full set of the exhibits used by the parties during trial, Honeywell has attempted to minimize the amount of duplication and burden on the Court by including in its Appendix only those pages from the materials actually cited to in the Proposed Findings of Fact and Conclusions of Law.

two-week trial in 2001 would have been unforeseeable to one of ordinary skill in the art in 1982-83. Second, the rationale underlying the narrowing amendments at issue bears no more than a tangential relation to the infringing Sundstrand equivalent. Because Honeywell has successfully rebutted the *Festo* presumption of prosecution history estoppel, the jury's February 16, 2001 verdict of infringement should be reinstated.

FINDINGS OF FACT

I. Procedural History

A. The Parties and the Complaint

1. Plaintiff Honeywell is a diversified technology company that sells, among other things, aerospace products, control technologies, automotive products, power generation systems, specialty chemicals, fibers, plastics and advanced materials. *See* February 2001 Trial Tr. ("Trial Tr.") at 315-17. The Honeywell Aerospace business is a leading provider of avionics, engines and components for aircraft. *Id.*

2. Defendant Hamilton Sundstrand manufactures and markets aerospace and industrial products. Trial Tr. at 1239-40. Sundstrand's aerospace business provides system components and services for aerospace customers. *Id.*

3. Honeywell filed this suit in May 1999, alleging that Sundstrand's APS 3200 auxiliary power unit infringed its U.S. Patent Nos. 4,380,893 ("the '893 patent") and 4,428,194 ("the '194 patent"). Both patents relate to the control of surge in APUs. As described in more detail in the Court's September 27, 2001 opinion (D.I. 306; 166 F.Supp.2d 1008) in this case, surge is an aerodynamic phenomenon relating to the instability of air being drawn through a load compressor, like that used in APUs. Unless properly controlled, surge can damage or destroy the compressor. Trial Tr. at 599-601 (Muller).

B. This Court's Prior Findings on Prosecution History Estoppel

4. Before trial, Sundstrand moved for summary judgment, claiming that Honeywell should be precluded from establishing infringement under the doctrine of equivalents because of amendments it had made during prosecution of the patents-in-suit. *See* Sundstrand's Motion for Summary Judgment (D.I. 104).

5. In ruling on Sundstrand's summary judgment motion, this Court reviewed the law of prosecution history estoppel as it then stood, including the Federal Circuit's recently issued initial *en banc* opinion in *Festo. Honeywell Int'l Inc. v. Hamilton Sundstrand Corp.*, No. Civ.A. 99-309 GMS, 2001 WL 66348, at *3-*5 (D. Del. Jan. 8, 2001) (D.I. 187). The Court then indicated that it would "engage in a detailed review of the relevant prosecution history," and made various findings of fact regarding the Honeywell patent file. *Id.* at *5.

6. Reviewing the prosecution history of the patents-in-suit, the Court found that "Honeywell did not surrender the elements at issue during the prosecution of the patents at issue," and that "Honeywell did not give up an embodiment of the invention with the inlet guide vane." *Id.* at *6. The Court proceeded to deny Sundstrand's motion for summary judgment. *Id.* at *7.

C. The Jury Finds Infringement Under Doctrine Of Equivalents

7. At trial in February 2001, Honeywell presented evidence that Sundstrand's APS 3200 surge control system infringed the patents-in-suit both literally and under the doctrine of equivalents. Honeywell relied on the testimony of numerous fact witnesses and of both its own technical expert, Gerard Muller, and Sundstrand's expert, Francis Shinskey, to contend that the APS 3200 infringed the Honeywell patents. *See, e.g.*, Trial Tr. at 475-81 (Zimmerer); 520-42, 545-48 (Suttie); 635-76, 681-95 (Muller); 1559-94 (Shinskey); 1738-43 (Greubel); 2544-2557 (Honeywell Closing St.).

8. Mr. Muller is a mechanical engineer with a Bachelor of Science degree from Applied Technical Institute of New York and a Masters of Science Degree from the University of Connecticut. 2006 Remand Trial Transcript (“Remand Tr.”) at 117 (Muller). Mr. Muller designed gas turbine engines for five years at Pratt-Whitney Aircraft and then worked for the technology department at Exxon Research and Engineering for 17 years. *Id.* at 117-18 (Muller). Mr. Muller testified as Honeywell’s expert on technical issues at both the 2001 jury trial and the 2006 Remand trial.

9. After a ten-day trial before this Court, the jury found that Sundstrand willfully infringed under the doctrine of equivalents all six asserted patent claims and awarded Honeywell \$46.6 million in damages. *See* Special Verdict Form (D.I. 264).

10. The Court affirmed the jury verdict in full in response to the parties’ post-trial motions. *Honeywell Int’l Inc. v. Hamilton Sundstrand Corp.*, 166 F. Supp.2d 1008 (D. Del. 2001).

D. Appellate Proceedings

11. An appeal to the Federal Circuit ensued. After the case was argued to a three-judge panel of that court in August 2002, the appellate court, *sua sponte*, ordered in February 2004 that the case would be resolved by the *en banc* court.

12. In June 2004, the *en banc* Federal Circuit held for the first time that Honeywell’s act of rewriting dependent claims in independent form, when combined with its cancellation of the antecedent independent claims, constituted a narrowing amendment and therefore gave rise to a presumptive surrender of equivalents by virtue of prosecution history estoppel. *Honeywell Int’l Inc. v. Hamilton Sundstrand Corp.*, 370 F.3d 1131, 1134 (Fed. Cir. 2004) (*en banc*), *cert. denied*, 125 S.Ct. 2928 (June 20, 2005) (No. 04-293). While the Federal Circuit thus reversed this Court’s prior legal conclusion regarding the effect of the rewriting of dependent claims into

independent form, it did not disturb this Court's factual findings regarding the course of prosecution of the Honeywell patents.

13. The *en banc* Federal Circuit also affirmed the jury's conclusion that Honeywell's patents were valid. *See* 370 F.3d at 1145-46.

14. The Federal Circuit therefore vacated the judgment of infringement and remanded the case to this Court for a determination of whether Honeywell can rebut the presumption of surrender of equivalents under the criteria set forth in *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722 (2002). *See* 370 F.3d at 1144, 1146.

15. The Supreme Court denied certiorari, 125 S.Ct. 2928 (June 20, 2005), and this Court accordingly received this matter on remand.

II. Prosecution History of the Patents-In-Suit

A. The Original Patent Applications

16. Honeywell's two patents-in-suit, the '893 and '194 patents, derive from a common patent application, filed February 19, 1981. JTX 30, 45.

17. The patents were separated into two distinct applications during prosecution, with the '893 patent containing only apparatus claims and the '194 patent containing only method claims. JTX 33 at HSB401563-64.

18. The three independent claims at issue at trial, independent Claims 8 and 19 of the '893 patent and independent Claim 4 of the '194 patent, appeared in the original patent applications as dependent application claims 17, 35 and 51, respectively. In each case, the claims on which they originally depended (application claims 16, 32 and 48, respectively) recited a surge control system featuring a flow-related parameter that was subject to proportional and integral control. JTX 31 at HSB401434, HSB401439-40; JTX 33 at HSB401556.

B. The Original Independent Claims Were Rejected Over the Prior Art

19. Proposed independent claims 16, 32 and 48 were rejected by the Examiner under 35 U.S.C. § 103 as being unpatentable in view of the prior art. JTX 33 at HSB401567; JTX 31 at HSB401456-57. Of significance for this Remand proceeding, it is undisputed that none of the art cited by the Examiner in his rejection contained inlet guide vanes or made any use of the position of such guide vanes in the surge control system. PTX 1021 at Resp. No. 5.

20. In particular, the Examiner cited the Shell, Rateau, and Metot patents as disclosing a surge control system with P and ΔP sensors and proportional and integral control. JTX 33 at HSB401566-401567; JTX 31 at HSB401456-57. *See* JTX 29 (Shell); PTX 1015 (Rateau); PTX 1006 (Metot). The Examiner also cited the Lewis Patent (JTX 28) as disclosing the use of a surge control system in conjunction with a “gas turbine engine.” JTX 33 at HSB 401567; JTX 31 at HSB 401457.

21. None of the Shell, Rateau, Metot or Lewis patents mentions inlet guide vane use, and none suggests that inlet guide vane position can be used as part of the surge control system. JTX 29, PTX 1015, PTX 1006, JTX 28. Sundstrand admits “that during the prosecution of the Patents-in-Suit, the Examiner did not reference any Prior Art that disclosed inlet guide vanes or the use of their position as part of a surge control system.” PTX 1021 at Response No. 5.

22. At the same time that the Examiner rejected application claims 16, 32 and 48, he “objected to” dependent application claims 17, 35 and 51, which had been directly or indirectly dependent on those claims. JTX 33, 31. The Examiner indicated that application claims 17, 35 and 51 “will be allowed if rewritten in independent form.” In making this statement, the Examiner did not mention that each of those claims included, among other additional elements, the use of inlet guide vane position. JTX 33 at HSB401565-567; JTX 31 at HSB401454-458.

23. In the same Office Action, the Examiner also indicated that application claims 14, 30 and 33 would be allowed once rewritten from dependent to independent form. These claims eventually issued as independent Claims 6, 17 and 18 of the '893 patent. JTX 30; JTX 31 at HSB401458. Significantly, these claims do not include any limitation relating to inlet guide vane position. Instead, the additional limitations contained in application claims 14, 30 and 33 included ones related to, for example, the rate of change of the error signal, and the temporary deactivation of the integral controller. *Id.* at HSB401462, HSB401465, HSB401469-471.

C. In Response, Honeywell Amended Its Claims To Add Multiple Elements

24. In response to these Office Actions, Honeywell cancelled application claims 16, 32 and 48 and rewrote application claims 17, 35 and 51 in independent form as requested by the Examiner. JTX 33 at HSB401570; JTX 31 at HSB401461. The Federal Circuit held this action by Honeywell to be a narrowing amendment, thus giving rise to the *Festo* presumption. *See* 370 F.3d at 1141-44.

25. Sundstrand's position at the Remand was that Honeywell's amendments added only "the inlet guide vane limitation" to the claims at issue. Remand Tr. at 69, 72 (Sundstrand Opening St.). The Court finds that this position is belied by the actual prosecution history and is based on a misunderstanding of the relevant law. In fact, Honeywell added multiple limitations to each of its claims during its amendments, only one of which for each claim was the use of inlet guide vane position in the surge control system.

26. Attached as Exhibit A is a copy of Sundstrand Demonstrative 3, used by Sundstrand's counsel during its Opening Statement to explain the amendments, with numbering added to identify the separate limitations that were added. Sundstrand concedes that, on its chart taken from the prosecution history, "what is not underlined is what comes in from the dependent claim." Remand Tr. at 65 (Sundstrand Opening St.).

27. For example, in rewriting application claim 17 from dependent to independent form, Honeywell effectively added to the elements of original independent claim 16 four limitations, each of which had been found in original application claim 17: 1) a flow-related parameter whose value is “substantially independent of the temperature of the compressed air;” 2) a comparator means having an “adjustable control set point representing said desired value of said parameter;” and 3) a “reset signal for varying said set point as a function of the position of said inlet guide vanes” 4) “in accordance with a predetermined reset schedule.” JTX 31 at HSB401466. The resulting claim issued as Claim 8 of the ‘893 patent.

28. These are four separate and distinct limitations. For example, while both the phrase “a reset signal for varying said set point as a function of the position of said inlet guide vanes,” and the language that the signal must be “in accordance with a predetermined reset schedule” appear in clause (f) of Claim 8, these are separate limitations. A surge control system could vary the set point as a function of inlet guide vanes without making use of a predetermined reset signal. Conversely, a surge control system could have a predetermined reset schedule, but could not vary the set point as a function of inlet guide vanes (as opposed to, for example, temperature).

29. The other two limitations that were added during the amendment of what became Claim 8 were to require that the flow-related parameter have a value that is “substantially independent of the temperature of the compressed air,” and to require that the surge control system include a comparator means having an “adjustable control set point representing said desired value of said parameter.” JTX 31 at HSB401466. Again, these are distinct limitations, separate and apart from the incorporation of inlet guide vane position. Sundstrand admitted that

these limitations were “two additional changes that actually came from the merger of the dependent claim.” Remand Tr. at 72 (Sundstrand Opening St.).

30. In a similar fashion, when Honeywell amended original application claim 35 and rewrote it from dependent to independent form to create Claim 19 of the ‘893 patent, Honeywell effectively added to the elements of application claim 32 four limitations, each of which had been found in original application claim 35: 1) “a guide vane position sensor;” and 2) “a function generator;” 3) “coupled in series;” 4) “between the inlet guide vanes and said input portion of said comparator.” JTX 31 at HSB401472.

31. The first of these added limitations in what became Claim 19 required the use of inlet guide vane position. The other three limitations were distinct requirements. For example, a surge control system could have a guide vane position sensor without a function generator, or it could have a function generator that was not coupled in series between the guide vanes and the input of a comparator. The separate nature of these limitations is confirmed by the fact that Honeywell addressed each of them during its infringement evidence at trial. Trial Tr. at 687-90 (Muller).

32. Finally, in amending original application claim 51 and rewriting it from dependent to independent form to create Claim 4 of the ‘194 patent, Honeywell added two elements to the limitations that had been found in original independent application claim 48: 1) “adjustable inlet guide vanes;” and 2) a control system that “adjust[s] the relationship between the magnitudes of said integral and proportional control signals and the magnitudes of said parameter variations as a function of the position of the inlet guide vanes.” JTX 33 at HSB401573.

33. The language “adjustable inlet guide vanes” was added to the preamble of what became Claim 4. JTX 33 at HSB401573. Sundstrand incorrectly claims that language appearing in the preamble of a patent may not function as a separate limitation. Remand Tr. at 65-66 (Sundstrand Opening St.). But such language may be treated as a separate limitation. “[W]hen the limitations in the body of the claim ‘rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention.’” *Bicon, Inc. v. The Straumann Co.*, 441 F.3d 945, 952 (Fed. Cir. 2006) (citing *Eaton Corp. v. Rockwell Int’l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003)). Indeed, the parties here treated this exact language from the preamble of Claim 4 as a separate limitation during the infringement trial in 2001. Trial Tr. at 638-39 (Muller).

34. It is important to note that all of the additional limitations identified above were added by Honeywell in response to the Examiner’s prior art rejection under Section 103. Honeywell also amended what became Claim 19 in response to the Examiner’s separate rejection of application claim 35 under 35 U.S.C. § 112 (requiring clear reference to antecedents in claims). The language added in response to the Section 112 rejection included “sensing device,” (added to Claim 19(c)), “regulating device,” (added to Claim 19(f)), and “to sense therein a predetermined parameter related to the air flow rate through the duct” (added to Claim 19(b)). JTX 31 at HSB 401476-77. Both parties agreed at the Remand hearing that the focus of the *Festo* inquiry was those limitations added in response to the Section 103 rejection and that the separate changes occasioned by the Section 112 rejection do not play a part in the analysis. Remand Tr. at 10 (Honeywell Opening St.); 70-71 (Sundstrand Opening St.).²

² Honeywell’s counsel inadvertently referred to Section 112 material added to Claim 19 during his opening statement but then immediately corrected the misstatement. Remand Tr. at 40.

35. Finally, contrary to Sundstrand's assertions (Remand Tr. at 75 (Sundstrand Opening St.)), neither the Federal Circuit nor the Patent Office stated that inlet guide vane position use was the only limitation added during the amendments. While the Federal Circuit found that Honeywell "effectively add[ed] the inlet guide vane limitation" to the claims, 370 F.3d at 1144, it never held that inlet guide vane use was the only element added to the claims, and it was not, as established above. By the same token, while the Solicitor General stated in his amicus brief to the Supreme Court that Honeywell had incorporated inlet guide vane use as "a necessary" limitation, he never stated or implied that it was the only necessary limitation added. Brief for United States as Amicus Curiae, *Honeywell Int'l Inc. v. Hamilton Sundstrand Corp.*, No. 04-293, at 18.

36. Once claims 17, 35 and 51 were rewritten in independent form as requested by the Examiner, they issued without further examination or comment. JTX 33 at HSB401575; JTX 31 at HSB401479. Specifically, application claims 17 and 35 issued as Claims 8 and 19 of the '893 patent on April 26, 1983, and application claim 51 issued as Claim 4 of the '194 patent on January 31, 1984. JTX 30, 45.

37. Thus, the provenance of the relevant Honeywell patent claims is as follows:

‘893 Patent

<u>Application</u>				<u>Patent</u>
Independent Claim 16	+	Dependent Claim 17	=	Claim 8
Independent Claim 32	+	Dependent Claim 35	=	Claim 19

‘194 Patent

<u>Application</u>				<u>Patent</u>
Independent 48	+	Dependent 49	+	Dependent 51 = Claim 4

D. There Was No Mention of IGV or the Equivalent During Prosecution

38. None of the prior art that was before the Examiner during prosecution (i) featured Sundstrand’s “unique” DELPQP flow parameter, (ii) made use of inlet guide vane position as part of the surge control system, or (iii) disclosed the infringing Sundstrand equivalent. PTX 1021 at No. 5.

39. The Examiner never once mentioned inlet guide vane use during the prosecution of either patent. DTX 31, 33. Similarly, other than in the claim language itself, Honeywell never mentioned inlet guide vanes or ascribed any significance to them during the prosecution.

III. The Equivalent: The Sundstrand APS 3200 Surge Control System

40. After a two-week trial in February 2001, the jury found that the surge control system of the APS 3200 APU infringed the asserted claims of the ‘893 and ‘194 patents, including independent claims 8, 19 and 4, under the doctrine of equivalents. *See* Special Verdict Form (D.I. 264).

A. APS 3200 Development History

1. Development Began in 1989, Six Years After Honeywell's Amendments

41. Sundstrand began developing the APS 3200 surge control system in 1989, six years after the relevant date in the prosecution of the Honeywell patents. Trial Tr. at 1254-55 (Johanson); *see also* PTX 1021 at No. 3. The APS 3200 surge control system used a parameter called “DELPQP.” PTX 1018 at ¶ 3. When Sundstrand first started working on the surge control logic for the APS 3200, Sundstrand was unaware that the DELPQP flow-related parameter featured a double-solution response curve. Trial Tr. at 1718 (Greubel). Having not yet identified that there was a double-solution curve in 1990, Sundstrand had also not “figured out how to solve the double-solution issue.” *Id.*

2. Sundstrand First Recognized the Double-Solution in 1991

42. In late 1991, during the initial development of the APS 3200, Sundstrand's design partner, Turbomeca, discovered that the DELPQP parameter produced a response curve that was not directly proportional to flow at all levels. Instead, “[w]hile the value of DELPQP initially rises as flow through the compressor increases, at an inflection point it peaks and thereafter actually decreases as flow further increases.” PTX 1018 at ¶ 11; PTX 1065, Suttie 10/24/00 Dep. at 467; Remand Tr. at 114-115 (Sundstrand Opening St.).

43. Turbomeca discovered the double-solution curve by running repeated, laborious rig tests on the APS 3200 compressor, measuring air flow through DELPQP, and then plotting the points on a chart. Suttie 10/24/00 Dep. at 467, PTX 1065.

3. Sundstrand Struggled For Four Years Before Developing The Equivalent System

44. Because the APS 3200 surge control system was very complicated, Sundstrand and Turbomeca were never able to develop a computer simulation or program that could be used

for development testing and instead had to rely on actual engine tests. Suttie 10/24/00 Dep. at 374.

45. Between 1991 and 1995, Sundstrand struggled to design a surge control system that could adequately address the peculiar double-solution flow curve created by the unique DELPQP flow-related parameter used on the APS 3200. *See, e.g.*, PTX 1018 at ¶¶ 11-14; JTX 9, JTX 13, JTX 15, PTX 1065, PTX 1114, PTX 1133, PTX 1134, PTX 1140. In this effort, Sundstrand was forced to enlist the assistance of its design partner Turbomeca, which had worked with Honeywell in implementing the patented surge control system on Honeywell's APUs. *See, e.g.*, JTX 9, JTX 13, JTX 15, PTX 1065, PTX 1133, PTX 1134, PTX 1140; Remand Tr. at 114-115 (Sundstrand Opening St.); Trial Tr. at 467-68 (Zimmerer); *id.* at 537-38 (Suttie).

46. Sundstrand initially utilized a "B Factor" test to determine which side of the DELPQP double-solution flow curve the APS 3200 load compressor was operating on. Suttie 6/29/00 Dep. at 238; PTX 1114; Remand Tr. at 115 (Sundstrand Opening St.). However, the B Factor test proved unreliable for this job. Suttie 6/29/00 Dep. at 238; PTX 1114, JTX 13, JTX 15, PTX 1133.

47. Sundstrand claimed during the Remand that it "determined that it should use IGV position to address the double solution behavior *within two months* of seeing the double solution curves." Sundstrand Trial Br. (D.I. 396) at 22 (emphasis in original). The record belied this assertion.

48. For example, in February 1993, more than a year after first encountering the problem, Sundstrand noted that while the 3200 "is correctly interpreting the inputs as being on the left side of the curve," "the load compressor is physically operating on the right side of the curve." Sundstrand concluded that the B Factor "algorithm may have to be re-evaluated." PTX

1114. That same day Sundstrand asked Turbomeca “that the ‘B Factor’ calculation be revised to prevent delays or loss of flow to the customer.” JTX 9.

49. By May 1993, the problem with the B Factor still had not been solved and Sundstrand still was unable to determine which side of the DELPQP double-solution flow curve the APS 3200 load compressor was operating on. Sundstrand “request[ed] that Turbomeca urgently define a better method of determining which side of the $\Delta P/P$ curve the load compressor is operating on.” JTX 15. Sundstrand told Turbomeca that “the B factor, as it has presently been defined is not acceptable for surge control.” *Id.* (emphasis in original).

50. As late as September 1994 -- nearly three years after identifying the issue -- Sundstrand and Turbomeca considered the “[p]ossibility of eliminating T7 from the B-Factor Calculation in order to provide a more reliable b-factor,” or “[e]liminat[ing] the dual solution of B-Factor by moving the diffuser holes.” PTX 1134. Several months later, Sundstrand reiterated that correctly interpreting the DELPQP flow curve remained a “critical problem” in need of immediate resolution. JTX 19.

51. Eventually, during the course of 1995, Sundstrand discovered that it could address the DELPQP phenomenon with the infringing equivalent system, which measured inlet guide vane position to reliably determine whether the DELPQP variable was on the right or left side of the inflection point. PTX 1018 at ¶¶ 13-14. Sundstrand incorporated this new test, which was the subject of the 2001 infringement trial, into all of its APS 3200 APUs. Suttie 6/29/00 Dep. at 249.

B. The Infringing Surge Control System of the APS 3200

1. Sundstrand's Unique DELPQP Flow-Related Parameter

52. Sundstrand conceded that the APS 3200 uses a “closed-loop [surge] control system” that is “based on comparing the sensed value of a parameter to a desired set point for that same parameter.” PTX 1018 at ¶ 2; Remand Tr. at 130 (Muller).

53. “While other conventional surge control systems include sensors that detect total pressures, the control logic of the APS 3200 uses only static pressure sensors to determine its flow related parameter,” a parameter denoted “DELPQP” by Sundstrand. PTX 1018 at ¶ 3.

54. In the APS 3200, DELPQP is calculated by “measuring the static pressures at two different locations within the load compressor, at the compressor outlet duct and compressor diffuser, and making a calculation involving subtracting one measurement from the other and dividing that result by the first value.” PTX 1018 at ¶ 3; Trial Tr. at 626 (Muller); Remand Tr. at 129-32 (Muller). That these two sensor locations are different and separate is confirmed, for example, by their depiction in Sundstrand Demonstrative Ex. 226. No surge control system prior to 1982-83 measured such values in these locations. Remand Tr. at 348 (Japikse).

55. This unique, never before used method of measuring flow in the APS 3200 utilizing DELPQP led to a flow curve that rose smoothly to a maximum level, and then instead of continuing to rise as flow increased, came back down as flow increased, thereby forming an inverted-V shaped flow curve. PTX 1018 at ¶ 11; Trial Tr. at 753-54 (Muller); Remand Tr. at 344 (Japikse); *id.* at 133-34 (Muller).

2. Sundstrand's Unique Use of Inlet Guide Vane Position

56. The behavior of DELPQP in the APS 3200 meant “a test was needed to determine whether one was on the left or right side of the inflection point. If one was on the right side of the curve, called ‘high flow’ mode, it would be necessary to ignore or ‘lock out’ the closed loop

surge control system to ensure that the bleed valve was not mistakenly opened to exhaust air. If DELPQP was on the left side of the curve, called ‘low flow’ mode, it would be necessary to permit the closed loop control system to control the bleed valve.” PTX 1018 at ¶ 12 (citing Suttie Dep.).

57. Mr. Shinskey, Sundstrand’s technical expert, testified that “it is by measuring the position of the inlet guide vanes that the APS 3200 surge control system insures that it does not go into low-flow mode when it actually should be in high-flow mode.” Trial Tr. at 1580. *See also id.* at 668-70 (Muller discussing same aspects of 3200 in his testimony); Remand Tr. at 143-44 (Muller). Honeywell relied heavily on this testimony from Shinskey when arguing infringement under the doctrine of equivalents to the jury during closing argument. Trial Tr. at 2550-51.

58. Sundstrand’s technical expert Dr. Japikse admitted that the APS 3200’s use of inlet guide vane position to address the double-solution flow curve generated by the DELPQP flow-related parameter was “the first one” of its kind. Remand Tr. at 361-62 (Japikse); *id.* at 144 (Muller).

C. Sundstrand Maintained at Trial that the APS 3200 Surge Control System Was “Unique”

59. At all points during the 2001 trial and its appeal, Sundstrand took the position that the APS 3200 surge control system, and its use of DELPQP and inlet guide vane position, was “unique” and “peculiar” to the infringing equivalent system. The Court finds later in this Opinion that Sundstrand is estopped from contradicting this factual position in the present Remand proceeding.

60. Sundstrand’s technical expert at the 2001 jury trial, Mr. Shinskey, contended that DELPQP “constitutes a unique measure of potential surge conditions within a centrifugal compressor, a measure not described elsewhere in patents or prior art.” November 10, 2000

Expert Report of Francis Shinskey at 9; *see also* Remand Tr. at 139-40 (Muller). Mr. Shinskey similarly testified at trial that, “I had never seen [the surge variable] used to control surge before in any work that I had ever done or in any publications that I have ever read.” Trial Tr. at 1335 (Shinskey). Mr. Shinskey also testified that the “only purpose” of the inlet guide vane position in the APS 3200 surge control system “is to protect against this possibility and it’s caused based on the unique characteristic of the DELPQP measurement as a function of flow.” *Id.* at 1383.

61. At the 2001 trial, Sundstrand presented Mr. Shinskey to the Court and the jury as a member of the “Control Hall of Fame.” Trial Tr. at 1326 (Shinskey). During closing arguments in February of 2001, Sundstrand’s counsel argued to this Court and to the jury that “Mr. Shinskey is a fellow with decades of experience and knowledge about controlling compressors. And as you know, has written books and articles, and has been invited to 50 different nations around the world to give lectures about controlling compressors. He’s the real McCoy. He’s a genuine expert. He knows what he’s talking about.” *Id.* at 2609 (Sundstrand Closing St.).

62. Sundstrand’s counsel also told the jury that “you will recall from the testimony that this particular parameter, DELPQP which has particular characteristics, follows a curve where it doesn’t correlate perfectly with air flow in the compressor. ... Therefore ... a separate test is built in [to the 3200 surge control system] that involves IGV position, ... this test determines which side of that curve you’re on. Is it in high flow or low flow?” Trial Tr. at 2599-2601 (Sundstrand Closing St.). Sundstrand’s counsel continued: “The only role of IGV position in this entire system is a back up test to determine whether because of the funny characteristic of this particular way to measure the air movement, the machine is in high or low-flow mode.” *Id.* at 2602 (Sundstrand Closing St.).

63. After the verdict, Sundstrand continued to maintain this position. For example, in a post-trial brief to this Court, Sundstrand stated:

The APS 3200's only use of inlet guide vane position is to deal with a problem unique to the unconventional parameter the APS 3200 uses to measure the movement of air through the compressor. ... The APS 3200's surge control system uses a *unique parameter measurement* that eliminates the need to adjust the set point as a function of the inlet guide vanes. Tr. 1356-57 (testimony of Hamilton Sundstrand expert Francis G. Shinskey). This parameter - called '**DELPQP**' and referred to as the 'Static Pressure Parameter' because it uses only static pressures - measures the rise in pressure across the compressor's diffuser, a set of stationary vanes that takes air from the impeller blades and increases its pressure. ... The only use the APS 3200 makes of inlet guide vane position is as part of a *control logic for dealing with a problem unique* to the Static Pressure Parameter.

Sundstrand Br. in Support of its Motion for Judgment as a Matter of Law (D.I. 275) at 3, 7-8 (emphases added).

64. Similarly, Sundstrand stated in its Federal Circuit appellate brief:

[T]he 3200 relies on the input of IGV position for a completely different purpose: as information the logic considers *in determining whether a condition peculiar to the 3200* has occurred, in which it should simply keep the surge valve shut.

Sundstrand Appellant Brief at 31 (emphasis added).

65. Sundstrand further stated in its appellate brief filed with the Federal Circuit that:

The 3200 employs an unusual parameter, called DELPQP, to measure both the flow and compression of air through the compressor. ... But *DELPQP has the odd characteristic* that when airflow reaches an extremely high level, DELPQP's value peaks and then actually starts to decrease even as airflow increases. ... Honeywell's own expert admitted that the high flow logic addresses *this unusual behavior of the 3200's DELPQP* parameter, which is '*special to the APS 3200*' and 'generates this *funny looking curve*' and that 'because of this *odd curve* ... you have this *odd control with an odd response*.'

Sundstrand Appellant Brief at 35-37 (emphases added).

D. The Jury And The Court Found The APS 3200 Surge Control System's Particular Use Of Inlet Guide Vane Position To Be An Infringing Equivalent.

66. The “particular equivalent in question” is the specific method and apparatus that the jury found infringed the Honeywell patents-in-suit, namely the Sundstrand APS 3200 surge control system with its unique DELPQP flow-related parameter and its particular use of inlet guide vane position as part of the high-flow logic that that parameter occasioned. Trial Tr. at 615-35, 638-76, 681-718, 730-60 (Muller); *id.* at 1328-30, 1332-30, 1332-69, 1379-1401, 1404-25, 1559-94 (Shinsky).

67. Honeywell presented particularized and extensive evidence and testimony to the jury regarding the Sundstrand APS 3200 surge control system's unique DELPQP flow-related parameter and its particular use of inlet guide vane position as part of the high-flow logic test (Trial Tr. at 615-35, 638-76, 681-718, 730-60 (Muller); *id.* at 1559-94 (Shinsky)), and it is that surge control system that the jury found infringed the Honeywell patents under the doctrine of equivalents. *See* Special Verdict Form (D.I. 264). The Court confirmed that finding of infringement in its post-trial ruling. *Honeywell Int'l Inc. v. Hamilton Sundstrand Corp.*, 166 F.Supp.2d 1008, 1021 (D. Del. 2001) (“Honeywell set forth competent evidence from which a jury could reasonably conclude that *the way the APS 3200 uses inlet guide vane position* is insubstantially different from the way inlet guide vane position is used in the patent claims.”) (emphasis added). *See also* 166 F.Supp.2d at 1024 (“[T]he court finds that Honeywell presented substantial, sufficiently particularized testimony comparing the elements of the APS 3200 to the elements of the patents-in-suit.”).

68. Honeywell used the same technical expert, Gerard Muller, to explain the operation of the APS 3200 surge control system at both the 2001 jury trial and the 2006 Remand trial. Mr. Muller used the same demonstratives to assist his testimony regarding the APS 3200 at

the Remand trial that he had used during the 2001 jury trial. *See* Remand Tr. at 122, 125, 128, 136 (Muller).

69. At the jury trial Mr. Muller described the design and operation of the APS 3200 surge control system in detail. *See, e.g.*, Trial Tr. 615-635 (Muller). Mr. Muller's testimony included the APS 3200's DELPQP flow-related parameter, which he testified calculated "the change in pressure between the diffuser, a position in the diffuser and a position at the discharge of the compressor," (Trial Tr. at 626 (Muller)), and its use of IGV position to determine whether the system was in high flow or low flow (*Id.* at 629). Mr. Muller testified at trial that the APS 3200 surge system infringed even though he acknowledged that the DELPQP flow-related parameter had a "funny looking curve" that was "special to the APS 3200" and that produced "this odd control with [an] odd response." Trial Tr. at 753, 754 (Muller). *See also* Trial Tr. at 638-76, 681-718, 730-60 (Muller).

70. During closing arguments, Honeywell's counsel emphasized to the jury that the limitations of the patent claims were met because "the APS 3200 surge control system insures that it does not go into low-flow mode when it actually should be in high-flow mode" by "measuring the position of the inlet guide vanes." Trial Tr. at 2551 (Honeywell Closing St.).

71. The equivalent that the jury found to infringe the Honeywell patents was not just *any* flow-related parameter that is a function of inlet guide vane position, as Sundstrand's new counsel asserted during the Remand proceeding. Remand Tr. at 48 (Sundstrand Opening St.). The two-week trial in February 2001 was about a particular surge control system -- the APS 3200's -- and its particular flow-related parameter, DELPQP, and its particular use of inlet guide vane position as part of the high-flow logic test. *See, e.g.*, Trial Tr. at 616-35; 638-76; 681-718,

730-60 (Muller); *id.* at 1328-30, 1332-69, 1379-1401, 1404-25, 1559-94 (Shinsky). It is that surge control system that the jury found to be an infringing equivalent of the Honeywell patents.

IV. State of the Art of Surge Control in 1982-83

72. Because the relevant amendments of the Honeywell patents took place in 1982 and 1983, both parties presented evidence on Remand on the state-of-the-art in surge control at the time. As set forth herein, the Court concludes that the art at the time did not include a surge control system like the equivalent APS 3200 system, and that the equivalent system was qualitatively different than the 1982-83 art.

A. The L1011 APU

73. Hamilton Sundstrand relies most heavily on an APU its predecessor, Hamilton Standard, developed for the L1011 aircraft in the early 1970s. Remand Tr. at 290 (Japikse); *id.* at 379-80 (Brown).

74. Sundstrand never once mentioned the L1011 during the February 2001 trial. Sundstrand now asserts that the L1011 APU is the closest piece of prior art to the APS 3200 surge control system. Remand Tr. at 314-15 (Japikse). Sundstrand's only two fact witnesses at the Remand trial both testified exclusively about the L1011 APU. *See* Testimony of Brown and Telakowski.

75. As set forth more fully below, the Court finds that there are numerous, significant differences between the L1011 surge control system and the later APS 3200 surge control system. These include:

- (a) the L1011 did not measure inlet guide vane position as part of its surge control system. Remand Tr. at 341-42 (Japikse); *id.* at 153-154 (Muller).
- (b) the L1011 APU does not and was not designed to efficiently operate close to surge. Remand Tr. at 408 (Brown); *id.* at 338 (Japikse).

- (c) the L1011 APU was designed with a pneumatic surge control system rather than a more technologically advanced fully electronic surge control system. Remand Tr. at 342-43 (Japikse).

76. Sundstrand admitted at the Remand that the non-electronic, pneumatic, non-IGV controlled L1011 APU surge control system represented the state-of-the-art in 1982-83 and remained so through 1985. Remand Tr. at 429 (Telakowski).

Description of the L1011 Surge Control System

77. The L1011 APU was designed with a pneumatic, rather than electronic, surge control system. A pneumatic system relies on the mechanical operation of valves and levers in response to pressure changes and has no electronic control components. Remand Tr. at 151-52 (Muller). The APS 3200 surge control system, on the other hand, is an electronic system. Electronic surge control systems are a technological advance over pneumatic systems. Remand Tr. at 342-43 (Japikse); *id.* at 152 (Muller).

78. The L1011 APU measures static pressure in four places, all located within the diffuser. Remand Tr. at 291 (Japikse); *id.* at 153 (Muller); DTX 399; Remand Tr. at 381-82 (Brown); DTX 105 at SUND 000499. In stark contrast, the APS 3200 surge control system measures static pressure in two places; one in the diffuser and the other in a completely separate, distinct location -- the discharge of the compressor, also called the scroll. Remand Tr. at 153 (Muller); PTX 1018 ¶ 3; *see also* Remand Tr. at 347 (Japikse); Sundstrand Demonstrative Ex. 226.

79. Of key significance given the issues in this Remand, the L1011 APU does not measure inlet guide vane position as part of its surge control system. Remand Tr. at 341-42 (Japikse); *id.* at 380-81 (Brown); *id.* at 153-54 (Muller).

80. The L1011 APU surge control system utilizes a shock switch to handle supersonic flow, which completely disabled the surge control system by dumping all air out to the

atmosphere as soon as the system detected supersonic flow. Remand Tr. at 150-51 (Muller); *id.* at 294 (Japikse). In contrast, the APS 3200 surge control system operates continuously throughout a supersonic condition, indicating which side of the double-solution flow curve the load compressor is operating on and controlling for it. *Id.* at 150-52 (Muller).

81. The L1011 shock switch does not “give any of [*sic*] indication of which side of [the] double value function you were operating on.” Remand Tr. at 400 (Brown). In further contrast to the APS 3200, the L1011 shock switch does not utilize inlet guide vane position in any way. *Id.* at 340, 361 (Japikse); *Id.* at 153-54 (Muller).

82. The L1011 APU was designed to operate away from the surge point, unlike APUs that utilized the patents-in-suit, like the APS 3200, which were designed to operate as near to the surge point as possible. Remand Tr. at 408 (Brown); *id.* at 338 (Japikse). *See also* Trial Tr. at 1666 (Shinsky).

83. There is no credible evidence that the L1011 APU experienced a double-solution flow curve in a manner similar to the APS 3200’s DELPQP flow curve. Rather, a block diagram from Hamilton Standard dated just months before the L1011 went into service shows that the L1011 flow-related parameter -- which was not DELPQP -- produced a smooth, rising curve as flow increased. PTX 1066 at SUND 006011 and 006029 (Fig. A7); Remand Tr. at 145-49 (Muller); *id.* at 404 (Brown); DTX 376.

84. Figure 9 of DTX 104, a May 30, 1975 memo, is the only document that Sundstrand pointed to during the Remand as purportedly showing a double-solution flow curve being experienced on the L1011 APU. Sundstrand did not call any witness who testified that he wrote, received or even saw the document.

85. In fact, DTX 104 relates to the “L-1011 APU Surge Control *Redesign Feasibility Study*.” DTX 104 (emphasis added); Remand Tr. at 409 (Brown). Figure 9 of DTX 104 actually plots, for a proposed redesign of the L1011, static pressure and *total* pressure, which the redesign study and Figure 9 labeled “PG2” and “PG3.” Remand Tr. at 410 (Brown); DTX 104 at SUND 000294, 000274-000275. Figure 9 of DTX 104 does not represent the flow curve for the static pressure measurements PS0, PS1, PS2 and PT used in the service version of the L1011 APU. Rather, Figure 9 related solely to a potential redesigned system -- a redesign that Mr. Telakowski confirmed was never implemented on the L1011 APU. Remand Tr. at 429 (Telakowski).

86. Faced with the complete lack of contemporaneous evidence that the L1011 experienced the double-solution flow curve, Sundstrand’s counsel asked Mr. Brown to draw in court a response curve that supposedly looked like drawings he had allegedly seen while working on the L1011 APU in the early 1970s, even though “the last time that [he] saw original data that looked like that [was when he was] involved in testing back in the early 1970s.” Remand Tr. at 408 (Brown). This evidence lacked credibility.

87. Even if this evidence were credited, the existence of some type of double-solution curve in the L1011 APU would not render the Sundstrand infringing equivalent foreseeable. The L1011 lacked critical features (such as use of IGV position in the surge control system) that even 20 years later Sundstrand’s engineers did not recognize as foreseeable when designing the APS 3200. Trial Tr. at 1718 (Greubel); JTX 9; JTX 15; PTX 1134; JTX 19.

88. Sundstrand Demonstrative Exhibits 232, 237 and 238 all depict Figure 9 of DTX 104, which plots static pressure and total pressure for the never-implemented L1011 redesign concept, rather than the static pressure parameter used by the actual service version of the L1011 APU.

89. Sundstrand and Lockheed, the manufacturer of the L1011, did not see a need to update the state-of-the-art L1011 APU at least through 1985. Remand Tr. at 429 (Telakowski).

**B. The Honeywell APUs Relied Upon By Sundstrand on Remand
Do Not Establish Foreseeability**

90. Sundstrand also introduced evidence regarding the surge control systems of various Honeywell APUs. None of the prior Honeywell systems, however, contained *any* of the unique features found in the APS 3200 surge control system, including the DELPQP flow-related parameter or the novel use of IGV position in response to the double-solution flow curve. It also necessarily follows that no prior Honeywell APU featured the combination of all of those features.

1. 331-200 APU

91. The 331-200 APU, designed by Honeywell in the 1970s, did not measure static pressure in the diffuser. Clark 12/6/05 Dep. at 137.

92. The 331-200 APU did not experience a double-solution flow curve. Clark 12/6/05 Dep. at 157; Honeywell Resp. to Sundstrand's First Set of Interrogatories on Remand, at Resp. No. 7. Accordingly, it necessarily did not use inlet guide vane position to address any double-solution like behavior.

2. 165-9 APU

93. The 165-9 APU designed by Honeywell for B-1 bomber:

- (d) did not have a load compressor. Clark 12/6/05 Dep. at 138.
- (e) did not have inlet guide vanes. Clark 12/6/05 Dep. at 61.
- (f) did not measure $\Delta P/P$. Clark 12/6/05 Dep. at 140.
- (g) did not experience the double-solution flow curve. Clark 12/6/05 Dep. at 138; Honeywell Resp. to Sundstrand's First Set of Interrogatories on Remand, at Resp. No. 7.

3. F-18 APU

94. The APU designed by Honeywell for the F-18 in the late 1970s did not use IGV as an input into a surge control system and did not adjust a set point based on IGV position. Clark 12/6/05 Dep. at 90, 265; DTX 182 at AS 085895 (“[t]he crux of surge control logic is to find one parameter that will indicate incipient surge *irrespective* of speed and inlet guide vane angle (IGV).”).

95. The F-18 APU was also a fully pneumatic system (Clark 12/6/05 Dep. at 90) and did not experience a double-solution flow curve. Honeywell Resp. to Sundstrand’s First Set of Interrogatories on Remand, at Resp. No. 7.

4. 331-350 APU

96. The 331-350 APU was developed in the late 1980s, many years *after* the relevant amendments. Remand Tr. at 300 (Japikse); Honeywell’s Resp. to Sundstrand’s First Set of Interrogatories on Remand, at Resp. No. 7; DTX 210. For this reason alone, it is not relevant to the state-of-the-art in 1982-83.

97. The similarity between the 331-350 APU surge control system and the earlier Honeywell patents-in-suit is not surprising, because the 331-350 utilizes the Honeywell patents-in-suit. Trial Tr. at 466 (Zimmerer).

98. Moreover, any similarity between the 331-350 and the APS 3200 is not coincidental. In 1992, during the development of the APS 3200 surge control system, Sundstrand had information regarding the design and operation of the Honeywell 331-350 surge control system. PTX 1041; Trial Tr. at 520-26 (Suttie). Sundstrand also had an actual 331-350 unit and was actively evaluating its design and operation. PTX 1104; PTX 62; Trial Tr. at 527-32 (Suttie).

99. Moreover, Turbomeca, with whom Sundstrand partnered on the design of the APS 3200 surge control system, had previously designed the load compressor for the 331-350. Trial Tr. at 467-68 (Zimmerer).

5. 131-3A/GPG APU

100. The 131-3A/GPG APU was not designed by Honeywell until after the relevant amendment dates. DTX 204 at RMD AS 265 (preliminary design review occurred in March 1985). The 131-3A/GPG APU was described by Honeywell as using a “unique new” surge control system in May 1985. DTX 203.

101. The 131-3A/GPG APU did not use IGV position as an input to the surge control system. DTX 203 at RMD AS 000094; DTX 202 at AS 000072.

102. The 131-3A/GPG APU did not use DELPQP or any measure of any type of $\Delta P/P$ as an input to its surge control system. *Id.*

103. The 131-3A/GPG APU did not experience the double-solution flow curve. Clark 12/6/05 Dep. at 202-203; Honeywell Resp. to Sundstrand’s First Set of Interrogatories on Remand at Resp. No. 7.

C. The Other Prior Art Relied Upon By Sundstrand on Remand Does Not Establish Foreseeability

104. Sundstrand also presented evidence on Remand, primarily through its expert, Dr. Japikse, of excerpts from various third-party prior art. Dr. Japikse did not focus exclusively on APU prior art but included in his prior art search all types of compressors. Remand Tr. at 334 (Japikse).

105. Indeed, Dr. Japikse did not focus exclusively on prior art references that relate to surge control systems. For example, Dr. Japikse relied on prior art references to inlet guide vanes outside the context of a surge control system. Remand Tr. at 334-35 (Japikse). In

addition, Dr. Japikse did not consider whether or what parts of the APS 3200 surge control system were equivalent to the patents-in-suit (Remand Tr. at 307) and did not take into account the claim language of the patents-in-suit when reaching his opinion as to whether the equivalent was foreseeable (*Id.* at 320).

106. Dr. Japikse himself admitted that none of the references he cited contained disclosures of the key aspects of the equivalent APS 3200 surge control system:

- (a) none made use of inlet guide vane position to determine the correct value of a flow-related parameter with a double-solution or inverted-V type flow curve. Remand Tr. at 361-62 (Japikse).
- (b) no surge control system measured static pressure in the same locations as DELPQP. Remand Tr. at 348 (Japikse).

107. In addition, Sundstrand provided no testimony at all about what would have motivated someone of ordinary skill in the art in 1982-83 to combine the specifically selected portions of its disparate references in any way, much less the way that Sundstrand argues on Remand. Rather, Sundstrand sought to combine these references through hindsight, which is improper in the related context of obviousness, and which this Court concludes below is improper in the context of foreseeability. The only evidence on motivation on Remand came from Honeywell expert Muller, who testified that a person of skill in the art in 1982-83 would not have been motivated to seek out disparate references like those relied upon by Sundstrand. Remand Tr. 137-39 (Muller).

108. Although these points are sufficient to dismiss any reliance on any of these other references put forth by Sundstrand, for the sake of completeness the Court reviews each briefly here.

1. Loss Patent

109. The Loss patent (DTX 313) is U.S. Patent No. 2, 470,565 issued May 17, 1949. Loss does not discuss the use of inlet guide vane position and static pressure sensors to determine a flow related parameter in the operation of a surge control valve. DTX 313. The Loss Patent teaches at most, a surge control system with a valve “that moves responsively to a differential existing between pressures acting on the opposed sides” of the valve. *See* DTX 313, col. 2, ll. 40-45. But Loss does not teach the measurement of pressure and the subsequent input of that measurement into the system in order to then determine the desired position of the valve. *See* DTX 313. Instead, the valve is responsive to the pressure, not to the determination of any discrete value. DTX 313, col. 2, ll. 40-45. Loss teaches a compressor that pneumatically responds to changes in pressure. DTX 313, col. 2, ll. 40-45. The Loss patent does not describe a system, whereby surge is controlled as a function of inlet guide vane position in response to an electronically measured flow-related parameter.

2. Glennon Patent

110. The Glennon Patent (DTX 327) is U.S. Patent No. 4,164,033 issued in August of 1979, relating to compressor surge control with airflow measurement. Glennon teaches a response to surge control where a valve is used to reduce pressure in the system. *Id.* at SUND 001661. Glennon does not describe a surge control system that is part of an auxiliary power unit. Furthermore, the Glennon patent does not discuss the use of inlet guide vane position or static pressure sensors to determine a flow related parameter in the operation of a surge control valve. Finally, the Glennon Patent was raised by Sundstrand as prior art at the February 2001 trial (Trial Tr. at 1498-1504 (Shinsky)) and was found by the jury not to anticipate or render obvious the technology at issue.

3. Warnock Article

111. The Warnock article (DTX 305) is a 1976 literature reference by Warnock that discusses compressor control configurations. Warnock does not describe a surge control system that is part of an auxiliary power unit. Furthermore, Warnock does not describe a system whereby surge is controlled as a function of inlet guide vane position in response to an electronically measured flow-related parameter. Indeed, the author notes that the surge control systems discussed in the manuscript were based on theoretical and not actual properties of the surge line. DTX 305 at HSC 101036. Also, Warnock does not discuss the use of inlet guide vane position or static pressure sensors to determine a flow related parameter in the operation of a surge control valve. Finally, the Warnock article was also raised by Sundstrand as prior art at the 2001 trial (Trial Tr. at 1447-68 (Shinskey)) and was found by the jury not to anticipate or render obvious the technology at issue.

4. Welliver and Acurio Report

112. The Welliver and Acurio Report (DTX 308) is a technical report published in 1967 by Welliver and Acurio discussing the design and development of small, single-stage centrifugal compressors. DTX 308 at SUND 007510. The report does not describe how to control surge in a compressor of an auxiliary power unit. Furthermore, the Welliver and Acurio Report does not discuss the use of inlet guide vane position as an input into a surge control system whereby static pressure sensors are used to determine a flow related parameter in the operation of a surge control valve.

5. American Society of Mechanical Engineers Article

113. The American Society of Mechanical Engineers article (DTX 282) is a literature reference by Rodgers that discusses the performance of centrifugal compressor channel diffusers. The Rodgers article does not describe an auxiliary power unit. Indeed, the primary goal of the

authors was to identify physical characteristics of both the impeller and diffuser that may enhance performance. See DTX 282 at SUND 004243. Even the authors note that further “experimental work” would be “necessary” before surge could be fully understood. DTX 282 at SUND 004254. Finally, the article does not discuss the use of inlet guide vane position or static pressure sensors to determine a flow related parameter in the operation of a surge control valve.

6. Garrett Performance Evaluation

114. The Garrett Performance Evaluation (DTX 312) was prepared in 1966, by Airesearch Manufacturing Company of America (a division of Garrett). The Garrett Evaluation does not describe a surge control system whereby surge is controlled through the use of inlet guide vanes as an input into the system. Furthermore, the evaluation does not describe how to control surge in an auxiliary power unit. Finally, the evaluation does not discuss the use of inlet guide vane position or static pressure sensors to determine a flow related parameter in the operation of a surge control valve.

7. Baghdadi Article

115. The Baghdadi article (DTX 217) is a literature reference published in 1977 that discusses the effect of rotor blade wakes on diffuser performance. The Baghdadi reference does not describe an auxiliary power unit wherein surge is controlled through the use of inlet guide vane position as an input into the system. Indeed, in analyzing the difference between flow produced by the vortex nozzle facility and that existing at the discharge of a compressor impeller, the authors recommend further and extensive pressure investigations of the surge flow. DTX 217 at SUND 007986. Finally, the article does not discuss the use of inlet guide vane position or static pressure sensors to determine a flow related parameter in the operation of a surge control valve.

8. Creare Diffuser Data Book

116. The Creare Diffuser Data Book (DTX 287) was published in 1975 and provides data on flat and conical diffusers generated by Creare. The Creare Book does not discuss the use of inlet guide vanes (IGVs) in a surge control system, and it does not discuss the use of IGV position as an input into a surge control system. Indeed, the authors note that the manuscript was not intended to address a detailed fluid physics discussion nor the “nuances of diffuser behavior.” DTX 287 at SUND 003443. Also, there is no description of a surge control system that is part of an auxiliary power unit. Finally, the book does not discuss the use of inlet guide vane position or static pressure sensors to determine a flow related parameter in the operation of a surge control valve.

9. Shapiro Text

117. The Shapiro text (DTX 293) is a 1953 literature reference that discusses general fluid dynamics and shock waves. The Shapiro text does not describe the necessity of controlling surge in an auxiliary power unit, let alone detail the workings of any surge control system. Furthermore, nowhere in the text does the author discuss inlet guide vanes, or their use in a compressor to control surge. Finally, Shapiro does not discuss the use of inlet guide vane position or static pressure sensors to determine a flow related parameter in the operation of a surge control valve.

10. Shouman and Anderson Article

118. The Shouman and Anderson article (DTX 295) is a 1964 literature reference that describes a control system to provide instantaneous power response with a gas turbine engine. *See* DTX 295 at SUND 003963. The Shouman and Anderson article does not describe the electronic control of a surge control system. Furthermore, the article does not discuss an auxiliary power unit whereby surge is controlled through a measured parameter that is an input

into the surge control system. Finally, Shouman and Anderson does not discuss the use of inlet guide vane position or static pressure sensors to determine a flow related parameter in the operation of a surge control valve.

11. Best Patent

119. The Best Patent (DTX 317) is U.S. Patent No. 3,047,210 that issued on July 31, 1962. The Best Patent does not teach the use of inlet guide vanes in a surge control system. Furthermore, the Best Patent does not teach or suggest the application of surge control specifically to auxiliary power units. At the most, Best teaches a compressor that pneumatically responds to changes in pressure. The Best patent does not describe a system whereby surge is controlled as a function of inlet guide vane position in response to an electronically measured flow-related parameter.

12. Runstadler and Dolan Article

120. The Runstadler and Dolan article (DTX 288) is a 1973 literature reference that discusses pressure recovery in diffusers. The Runstadler and Dolan article does not describe a surge control system or even the need to control surge in a compressor. Furthermore, nowhere do the authors suggest that the application of their data would be particularly useful in an auxiliary power unit. Also, Runstadler and Dolan do not describe inlet guide vanes or their use to control surge. Finally, Runstadler and Dolan do not suggest the use of inlet guide vane position or static pressure sensors to determine a flow-related parameter in the operation of a surge control valve as a method of controlling surge.

CONCLUSIONS OF LAW

121. Based on its Findings of Fact, the Court concludes that Honeywell has successfully rebutted the presumption of prosecution history estoppel for two independent reasons. First, the Sundstrand equivalent would have been unforeseeable to one of ordinary skill in the art at the time of the amendments. Second, the rationale underlying the amendments bears no more than a tangential relation to the Sundstrand equivalent.

122. Because Honeywell has successfully rebutted the presumption of prosecution history estoppel, the jury's February 16, 2001 verdict of infringement is hereby reinstated.

I. Law Governing This Remand

123. The issue before the Court on Remand is whether Honeywell can overcome the presumption that it is estopped from recapturing equivalents to the "inlet guide vane limitation." *Honeywell International Inc. v. Hamilton Sundstrand Corp.*, 370 F.3d 1131, 1134 (Fed. Cir. 2004).

A. The Doctrine Of Equivalents Remains Firmly Entrenched in Patent Law

124. The doctrine of "equivalents remain[s] a firmly entrenched part of the settled rights protected by the patent." *Festo*, 535 U.S. at 733.

125. Under the doctrine of equivalents, "a product or process that does not literally infringe upon the express terms of a patent claim may nonetheless be found to infringe if there is 'equivalence' between the elements of the accused product or process and the claimed elements of the patented invention." *Warner-Jenkinson Co., Inc. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 21 (1997). Here, of course, the jury found an equivalence between the APS 3200 surge control system and the asserted claims of the Honeywell patents.

126. Prosecution history estoppel "ensures that the doctrine of equivalents remains tied to its underlying purpose. ... The doctrine of equivalents is premised on language's inability to

capture the essence of innovation, but a prior application describing the precise element at issue undercuts that premise. In that instance the prosecution history has established that the inventor turned his attention to the subject matter in question, knew the words for both the broader and narrower claim, and affirmatively chose the latter.” *Festo*, 535 U.S. at 734-35.

B. Rebuttal Criteria Under *Festo*

127. Under the Supreme Court’s *Festo* decision, a narrowing amendment made during patent prosecution for reasons relating to patentability creates a presumption that the patentee cannot capture equivalents to the narrowed limitation in a later infringement action. *Festo*, 535 U.S. at 740. However, that presumption can be rebutted if the patentee can prove that the specific equivalent at issue in a particular case was not surrendered by the narrowing amendment. *Id.*

128. The patentee bears “the burden of showing that the amendment does not surrender the particular equivalent in question.” 535 U.S. at 740. Under *Festo*, there are three alternative ways by which a patentee can rebut the presumption of prosecution history estoppel: (1) by proving that “the rationale underlying the amendment [bears] no more than a tangential relation to the equivalent in question;” (2) by proving that the equivalent was “unforeseeable” at the time of the amendment; or (3) by proving that there is “‘some other reason’ suggesting that the patentee could not reasonably have been expected to have described the alleged equivalent.” *Festo*, 535 U.S. at 740-41.

129. The Supreme Court made clear that “[t]his presumption is not [] just the complete bar by another name.” *Festo*, 535 U.S. at 741.

130. The overall focus in determining whether the presumption has been rebutted is whether the narrowing amendment “surrender[ed] the particular equivalent in question.” *Festo*, 535 U.S. at 740.

131. This Court found factually in earlier proceedings that “Honeywell did not surrender the elements at issue during the prosecution of the patents at issue” and that “Honeywell did not give up an embodiment of the invention with the inlet guide vane.” *Honeywell International Inc. v. Hamilton Sundstrand*, 2001 WL 66348, *6 (D. Del. Jan. 8, 2001). Those factual findings were left undisturbed by the Federal Circuit’s legal rulings.

132. Sundstrand’s attempt to twist the Court’s language in order to avoid the impact of its findings is rejected. The Court did not focus on the wrong question, as Sundstrand asserts. Remand Tr. at 46 (Sundstrand Opening St.). Rather, the Court’s prior factual determination that “Honeywell did not give up an embodiment of the invention with the inlet guide vane,” 2001 WL 66348, at *6, directly addresses the question now before the Court of whether Honeywell “surrender[ed] the particular equivalent in question.” *Festo*, 535 U.S. at 740.

C. Procedural Issues Governing Remand

133. The question of whether the presumption is rebutted is one of law to be determined by the Court. *Festo*, 344 F.3d at 1367.

134. The Court acts as the finder of fact for any factual determinations informing that question of law. *Festo*, 344 F.3d at 1368 n.3.

135. Honeywell can rebut the presumption under any one of the three criteria announced by the Supreme Court in *Festo* by a preponderance of the evidence. *Cordis Corp. v. Medtronic Ave., Inc.*, 336 F. Supp. 2d 363, 367 (D. Del. 2004).

II. The Sundstrand Equivalent Was Unforeseeable to One of Ordinary Skill In 1982-83

136. The Court concludes that the APS 3200 surge control system would have been unforeseeable to one of ordinary skill in the art in 1982-83. Specifically, the particular use of inlet guide vane position made by the APS 3200 surge control system would not have been foreseeable to one of ordinary skill in the art in 1982-83. *See, e.g.*, Remand Tr. at 137 (Muller).

A. Law Governing Unforeseeability

137. The unforeseeability “criterion presents an objective inquiry, asking whether the alleged equivalent would have been unforeseeable to one of ordinary skill in the art at the time of the amendment. Usually, if the alleged equivalent represents later-developed technology (e.g., transistors in relation to vacuum tubes, or Velcro(R) in relation to fasteners) or technology that was not known in the relevant art, then it would not have been foreseeable. In contrast, old technology, while not always foreseeable, would more likely have been foreseeable.” *Festo*, 344 F.3d at 1369 (citation omitted).

138. “The patentee, as the author of the claim language, may be expected to draft claims encompassing *readily known equivalents*.” *Festo*, 535 U.S. at 740 (emphasis added). By contrast, an equivalent that was not readily known at the time of the amendment is not foreseeable, and therefore is not abandoned by a failure to capture it through the literal claim language. *BEI Tech, Inc. v. Matsushita Elec. Indus. Co.*, 268 F. Supp.2d 782, 802 (E.D. Mich. 2003) (equivalent was not foreseeable because it “was qualitatively different than what went before”). *See also Smithkline Beecham Corp. v. Excel Pharm. Inc.*, 356 F.3d 1357, 1364 (Fed. Cir. 2004) (“The Supreme Court ties foreseeability to whether the applicant would have been expected *to know of*, and thus properly claim, the proposed equivalent at the time of the amendment.”) (emphasis added).

139. The concept of foreseeability is akin to obviousness. *Johnson & Johnston Associates Inc. v. R.E. Service Co., Inc.*, 285 F.3d 1046, 1063 (Fed. Cir. 2002) (Lourie, J., concurring). Obviousness analysis under 35 U.S.C. § 103 asks whether a particular invention would have been obvious to one of ordinary skill in the art at the time of the invention. *Medichem v. Rolabo*, 437 F.3d 1157, 1164 (Fed. Cir. 2006) (“In making obviousness determinations, the test is ‘whether the subject matter of the claimed inventions would have been

obvious to one skilled in the art at the time the inventions were made, *not* what would be obvious to a judge after reading the patents in suit and hearing the testimony.”) (emphasis in original) (citing *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 1092 (Fed. Cir. 1985)). Similarly, foreseeability asks whether a particular equivalent would have been foreseeable to one of ordinary skill in the art at the time of the amendment. *Festo*, 344 F.3d at 1369. Because of this analytical similarity, courts have employed obviousness-type analysis in assessing foreseeability. *See, e.g., Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 2005 WL 1398528 (D.Mass. 2005) (citing *Bancorp Servs., L.L.C. v. Hartford Life Ins. Co.*, 359 F.3d 1367, 1375 (Fed. Cir. 2004); *In re Clay*, 966 F.2d 656 (Fed. Cir. 1992)). Indeed, Sundstrand itself has cited obviousness cases to the Court in presenting its arguments on foreseeability. *See, e.g., Sundstrand Demonstrative Ex. 240* (citing *Custom Accessories v. Jeffrey-Allan Industries, Inc.*, 807 F.2d 955 (Fed. Cir. 1986)).

140. Even before the establishment of the Federal Circuit, courts were inclined to equate unforeseeability with nonobviousness. The Third Circuit long ago noted that where two experts were unable to foresee the solution later provided by the patent, an inference of nonobviousness is warranted. *Jones Knitting Corp. v. Morgan*, 361 F.2d 451, 458 (3rd. Cir. 1966).

B. APS 3200 Surge Control System Was Unforeseeable Under Sundstrand’s Characterization of the Equivalent at the 2001 Trial

141. At the 2001 trial and its aftermath, it was established beyond challenge that DELPQP was a “unique measure of potential surge conditions” that was “not described elsewhere in patents or prior art.” November 10, 2000 Expert Report of Francis Shinskey at 9. Sundstrand’s expert testified that, “I had never seen [DELPQP] used to control surge before in any work that I had ever done or in any publications that I have ever read.” Trial Tr. at 1335

(Shinskey). Sundstrand further introduced evidence that the “only purpose” of the use of inlet guide vane position in the 3200 “is to protect against this possibility [of the system incorrectly interpreting a high flow condition as a low flow condition], and it’s caused based on the unique characteristic of the DELPQP measurement as a function of flow.” Trial Tr. at 1383 (Shinskey).

142. Similarly, Sundstrand argued in closing argument that the 3200 surge control system made use of inlet guide vane position “because of the funny characteristic of this particular way to measure the air movement.” Trial Tr. at 2602 (Sundstrand Closing St.). And in post-trial briefing to this Court, Sundstrand proclaimed that “[t]he APS 3200’s only use of inlet guide vane position is to deal with a problem unique to the unconventional parameter the APS 3200 uses to measure the movement of air through the compressor.... The only use the APS 3200 makes of inlet guide vane position is as part of a control logic for dealing with a problem unique to” DELPQP. D.I. 275 at 3, 8.

143. These admissions by Sundstrand in the prior phase of this case establish beyond any debate that the APS 3200 surge control system and its particular use of inlet guide vane position, which was not developed until 1995, was unforeseeable in 1982-83. If the Sundstrand equivalent was “unique” when designed in 1995, it could not have been “readily known” to one of ordinary skill in the art in 1982-83. *Festo*, 535 U.S. at 740. *See also Festo*, 344 F.3d at 1369 (“usually if the alleged equivalent represents . . . technology that was not known in the relevant art, then it would not have been foreseeable.”); *BEI Tech., Inc. v. Matsushita Elec. Indus. Co.*, 268 F.Supp.2d 782, 802 (E.D. Mich. 2003) (equivalent was not foreseeable because it “was qualitatively different than what went before.”).

1. Sundstrand is Judicially Estopped From Reversing Its Position on Remand

144. While Sundstrand attempted on Remand to disavow its prior testimony and argument that the APS 3200 surge control system and its particular use of inlet guide vane position was “unique,” it is prevented from doing so under the doctrine of judicial estoppel.

145. Judicial estoppel “prohibit[s] parties from deliberately changing positions according to the exigencies of the moment.” *New Hampshire v. Maine*, 532 U.S. 742, 750 (2001). Without the doctrine of judicial estoppel, parties could freely change their positions at different stages of a litigation and thereby produce inconsistent determinations, which compromises the integrity of the judicial process. *Id.* at 751.

146. The factors that inform a court’s decision whether to apply judicial estoppel include: 1) whether a party’s later position is clearly inconsistent with its earlier position, 2) whether a party has succeeded in persuading a court to accept that party’s earlier position and 3) whether the party seeking to assert an inconsistent position would derive an unfair advantage or impose an unfair detriment on the opposing party if not estopped. *New Hampshire v. Maine*, 532 U.S. 742, 750 (2001); *see also In re Armstrong World Indus., Inc.*, 432 F.3d 507, 517 (3rd. Cir. 2005)³ (“Judicial estoppel can be applied when a party asserts a certain position in a legal proceeding and prevails, only to assert a contrary position later on because of changed interests.”) (citing *New Hampshire*, 532 U.S. at 749-51).

147. The Court determines that judicial estoppel applies here. Sundstrand made the “uniqueness” of the APS 3200 surge control system a cornerstone of its defense in front of the jury. In support of this defense, Sundstrand introduced the testimony of Mr. Shinskey, who was

³ In *Lampi Corp. v. American Power Products, Inc.*, 228 F.3d 1365, 1377 (Fed. Cir. 2000), the Federal Circuit held that regional Circuit law applies to the issue of whether judicial estoppel is warranted.

portrayed as a world-class controls expert, and who testified of the then-accused system that “I had never seen that used to control surge before in any work that I had ever done or in any publications that I have ever read.” Trial Tr. at 1335 (Shinskey). On Remand, Sundstrand, represented by new lead counsel, put forward a new technical expert, Dr. Japikse, to contradict the testimony of Mr. Shinskey. The Court finds that Sundstrand would derive an unfair advantage here if allowed to take inconsistent positions from those upon which it relied at the earlier trial. Such conduct also threatens the integrity of the judicial process.

148. Sundstrand makes no attempt to argue that its trial and Remand positions are consistent. Instead, Sundstrand argues that judicial estoppel does not apply because it did not prevail with its earlier position. Remand Tr. at 111 (“[O]ne of the key factors, No. 2, is whether the party has succeeded in persuading the Court....The jury didn’t buy [Sundstrand’s position at trial].”). The Court rejects this argument. Sundstrand has indeed prevailed on important claims in this litigation on the basis of its argument at trial that the 3200 surge control system is “unique.” Accordingly, even under Sundstrand’s view of the law, it would still be prevented from expediently changing its position on Remand.

149. By arguing that the APS 3200 surge control system and its use of DELPQP and IGV position was unique, Sundstrand prevailed on at least two important issues during the earlier phase of this case: the holding by the jury, upheld by this Court, that Claim 4 of the ‘194 patent was *not* infringed literally, and the decision of this Court not to impose enhanced damages, notwithstanding the jury’s supported finding of willful infringement. In light of Sundstrand’s success on these issues, based at least in part on its repeated arguments about the “uniqueness” of the infringing surge control system, application of judicial estoppel is particularly appropriate here.

150. As for literal infringement, Sundstrand relied at trial on the testimony of Mr. Shinskey, as quoted above, to successfully refute Honeywell's allegation of literal infringement of Claim 4. In closing argument, Sundstrand's counsel referred to "this particular parameter, DELPQP, which has particular characteristics" in challenging the literal infringement claim. Trial Tr. 2599 (Sundstrand Closing St.); *generally* Trial Tr. 2590-2619.

151. Similarly, after the jury returned a verdict of no literal infringement of Claim 4 and Honeywell moved for judgment as a matter of law on that claim, Sundstrand successfully defended that part of the jury's verdict by referencing the very testimony in which Shinskey testified to the "uniqueness" of the 3200 surge control system. *See* Hamilton Sundstrand's Brief In Opposition To Honeywell's Rule 50 Motions For Judgment As A Matter Of Law (D.I. 280) at 20-21 ("In addition, unlike a conventional flow-related parameter, the value of the Static Pressure Parameter at which surge will occur does not change with inlet guide vane position. Tr. 1356:21-1357:4; 1406:24-1407:15."). In the cited portion, Shinskey testified that the "APS 3200 is a combination of the differential pressure taken across the diffuser ... And this produces a *unique* measurement." Trial Tr. 1356 (Shinskey). Sundstrand similarly argued in its opposition to Honeywell's post-trial motion that "[e]ven Honeywell's expert Gerard Muller conceded that the way the Static Pressure Parameter is measured is 'special' and that its behavior is 'funny.'" *See* D.I. 280 at 21.

152. In reliance on these arguments, and citing this very portion of Mr. Shinskey's testimony, this Court rejected Honeywell's JMOL argument and upheld the jury's finding of no literal infringement of Claim 4. *See Honeywell Int'l. Inc. v. Hamilton Sundstrand Corp.*, 166 F.Supp.2d 1008, 1018 (D.Del. 2001) ("Although Sundstrand's witnesses did at times indicate that flow is a component of the Static Pressure Parameter, *see, e.g.*, Tr. 1581-82, there is also

evidence in the record where Sundstrand's witnesses opined that DELPQP cannot be considered a flow-related parameter, *see, e.g.*, Tr. 1356-1358. Based on the evidence presented at trial, the jury could have reasonably determined that the APS 3200's use of DELPQP did not literally infringe the patents.").

153. In other words, the Court expressly found that the jury could have credited Sundstrand's evidence regarding DELPQP and the use of inlet guide vanes that it occasioned in the APS 3200. As such, it is beyond dispute that Sundstrand did indeed benefit from the position it now attempts to contradict.

154. Additionally, Sundstrand benefited a second time from its trial position that the infringing surge control system was "unique" when this Court found that enhanced damages were not warranted in this case, notwithstanding the jury's finding of willful infringement. *Honeywell Int'l. Inc. v. Hamilton Sundstrand Corp.*, 166 F.Supp.2d 1008, 1040 (D.Del. 2001). Indeed, when ruling in Sundstrand's favor on the issue of enhanced damages, this Court found that "Sundstrand mounted a substantial challenge to Honeywell's infringement contentions" and that the "issue of infringement was a close case." *Id.* at 1041. Under the jury's damages award and willfulness finding, the Court could have determined to award upwards of an additional \$100 million in damages had it viewed that result as warranted. Accordingly, there can be no dispute that Sundstrand received a very substantial benefit by virtue of the testimony of Mr. Shinskey that it sought to contradict on Remand.

155. In light of the issues on which Sundstrand prevailed based on its prior evidence and argument, it would produce an unacceptably inconsistent verdict to allow Sundstrand to contradict that evidence now in an attempt to prevail on the unforeseeability issue. In upholding the jury's finding of no literal infringement of Claim 4 and refusing to enhance the damages

award, this Court accepted Sundstrand's arguments that the 3200 surge control system was unconventional and unique. Should this Court now adopt Sundstrand's completely inconsistent argument on Remand that the 3200 surge control system was actually conventional and foreseeable, the result would be two verdicts that cannot be reconciled with each other. This is exactly the type of result that judicial estoppel guards against. *New Hampshire v. Maine*, 532 U.S. 742, 751 (U.S. 2001) (noting that inconsistent court determinations pose a threat to judicial integrity).

156. Finally, the Court notes an additional inconsistency that would arise if Sundstrand were permitted to contradict its trial proof on the uniqueness of the equivalent surge control system. In its post-trial ruling, the Court held that substantial evidence supported the jury's finding of infringement under the doctrine of equivalents. *Honeywell Int'l. Inc. v. Hamilton Sundstrand Corp.*, 166 F.Supp.2d 1008, 1022-24 (D.Del. 2001). Sundstrand appealed that ruling, but the Federal Circuit did not reach that issue given its remand on the *Festo* issue. *Honeywell Int'l Inc. v. Hamilton Sundstrand Corp.*, 370 F.3d at 1146. In challenging the sufficiency of the evidence in its brief to the Federal Circuit, as quoted above, Sundstrand relied repeatedly on the trial testimony regarding the "unique," "unconventional," "unusual," "special," "odd" and "peculiar" nature of the 3200 surge control system. Sundstrand Appellant Brief at 31, 35-37. As such, Sundstrand is judicially estopped from changing its position here.

2. As a Separate Basis For Decision, Sundstrand's Attempt to Contradict Its Prior Proof Lacked Credibility

157. Even if the doctrine of judicial estoppel did not apply, the Court, acting as finder of fact in this Remand proceeding, would find that the attempt of Sundstrand's new counsel to introduce through a new expert testimony that directly contradicted the testimony of its prior

expert lacked credibility. Accordingly, the Court rejects as a factual matter the testimony of the new expert, Dr. Japikse.

158. At the 2001 trial, Sundstrand presented Mr. Shinskey to the Court and the jury as a member of the “Control Hall of Fame.” Trial Tr. at 1326 (Shinskey). During closing arguments, Sundstrand’s counsel argued to this Court and to the jury that “Mr. Shinskey is a fellow with decades of experience and knowledge about controlling compressors. And as you know, has written books and articles, and has been invited to 50 different nations around the world to give lectures about controlling compressors. He’s the real McCoy. He’s a genuine expert. He knows what he’s talking about.” *Id.* at 2609 (Sundstrand Closing St.).

159. By contrast, during these Remand proceedings, Sundstrand’s new counsel did not submit an expert disclosure or any testimony from Mr. Shinskey. Instead, without explanation, Sundstrand replaced Mr. Shinskey with a new expert, Dr. Japikse.

160. Dr. Japikse -- in direct contradiction to Mr. Shinskey, Sundstrand and Sundstrand’s prior counsel’s assertions earlier in the case -- testified on Remand that the flow-related parameter DELPQP used by Sundstrand on the APS 3200 was simply delta P over P, which was allegedly well known in 1982. Remand Tr. at 259-60 (Japikse). Similarly, in its trial brief Sundstrand asserted that “Honeywell’s broad assertion that the ‘flow-related parameter used in the APS 3200, which Sundstrand termed DELPQP, was novel and had never been used before’ is simply not true.” Sundstrand Trial Br. (D.I. 396) at 14. Sundstrand’s new position taken at the remand trial is irreconcilably inconsistent with the position that it urged the jury, this Court, and the Federal Circuit to adopt in the prior stages of this proceeding.

161. Moreover, Sundstrand made almost no attempt to explain away these direct contradictions, and what little attempt it did make was itself lacking in credibility. For example,

in its Remand trial brief, Sundstrand claimed that “Mr. Shinskey had not conducted a search of the prior art for a flow related parameter like the APS 3200 used.” Sundstrand Br. at 17. This facially implausible argument -- which would have the Court believe that Sundstrand rested its entire technical defense to a \$70 million damages claim on an expert who, simply put, did not know what he was talking about in his sworn testimony -- is squarely contradicted by the record and evidence that Sundstrand presented to the jury in 2001. In reality, Mr. Shinskey testified at length to the jury regarding “the many references of prior art” that he located during his search. Trial Tr. at 1425-26 (Shinskey). Moreover, Sundstrand made no effort to prove at the Remand trial that Mr. Shinskey’s analysis had been limited in this way. Sundstrand’s assertion, in an effort to contradict its prior proof, that, in fact, its “Hall of Fame” expert Mr. Shinskey did not know what he was talking about and was ignorant of huge swaths of relevant prior art lacks all credibility.

162. The Court also notes that Dr. Japikse overstated his alleged relevant experience in his testimony. Specifically, while Dr. Japikse testified that his four most recent patents are “actually on surge control mechanisms,” (Remand Tr. at 356 (Japikse)), one of those patents does not even mention the word “surge.” *Id.* at 359 (Japikse).

163. Accordingly, even if it were not bound to do so as a matter of judicial estoppel, the Court would reject Sundstrand’s new proof of the supposed foreseeability of the APS 3200 surge control system on credibility grounds. The result, again, is that the record regarding the equivalent infringing system from the 2001 trial, combined with Honeywell’s additional evidence on Remand, establishes that the equivalent would have been unforeseeable to one of ordinary skill in the art in 1982-83.

C. As Another Separate Basis For Decision, Even Leaving Aside Sundstrand's Proof From the Original Trial, the Equivalent Was Unforeseeable

164. As yet another independent basis for the Court's decision, if the Court were limited solely to the record presented at the recent Remand trial -- and, as set forth above, the prior evidence strongly informs and compels the Court's decision -- the Court would nonetheless conclude that the APS 3200 surge control system and its particular use of inlet guide vane position would not have been "readily known" in 1982-83 and therefore was unforeseeable.

1. The APS 3200 Surge Control System is After-Developed Technology

165. It is undisputed that the APS 3200 APU did not exist in 1982-83. As a matter of undisputed chronology, Sundstrand did not start working on the APS 3200 until 1989 -- years after the prosecution of the Honeywell patents had been completed -- and did not develop the final, infringing configuration until 1995, more than a decade after the amendments at issue. Trial Tr. at 1254-55 (Johanson); PTX 1018 at ¶ 14; *see also* PTX 1021 at Resp. No. 3.

166. In 1990, when Sundstrand first started working on the surge control logic for the APS 3200, Sundstrand did not even know that the DELPQP flow-related parameter featured on the APS 3200 would produce the double-solution response curve. Trial Tr. at 1718 (Greubel). It was that double-solution flow curve that led to the APS 3200's novel use of inlet guide vane position. Remand Tr. at 361-62 (Japikse); Trial Tr. at 1383 (Shinsky); *id.* at 2602 (Sundstrand Closing St.).

167. As such, the APS 3200 represents later-developed technology that did not exist in 1982-83 and was not foreseeable under *Festo*. *Festo*, 344 F.3d at 1369 ("if the alleged equivalent represents later-developed technology . . . then it would not have been foreseeable."). *See also BEI Tech., Inc. v. Matsushita Elec. Indus. Co.*, 268 F.Supp.2d 782, 802 (E.D. Mich.

2003) (equivalent was not foreseeable because it “was qualitatively different than what went before.”)

2. The Remand Evidence Confirmed the Uniqueness of the Sundstrand Equivalent

168. Sundstrand could not point to any example in the art prior to 1982-83 of the surge control system used in the APS 3200. Remand Tr. at 314-15 (Japikse). There are no examples in the prior art existing through 1983 of a surge control system that uses inlet guide vane position to determine which side of a double-solution flow curve the load compressor was operating on, and therefore no examples in the prior art of inlet guide vane position being used in a surge control system as it later was by the APS 3200. Remand Tr. at 361-62 (Japikse); *id.* at 139, 144 (Muller). Because the system did not exist in the prior art, it could not have been foreseeable under *Festo*. *Festo*, 344 F.3d at 1369 (“if the alleged equivalent represents . . . technology that was not known in the relevant art, then it would not have been foreseeable.”).

169. Moreover, as noted above, DELPQP is calculated through use of one static pressure sensor located in the diffuser and the other static pressure sensor located in the compressor outlet duct. PTX 1018 at ¶ 3; Sundstrand JMOL Br. (D.I. 275) at 7-8; Remand Tr. at 129-32 (Muller). Sundstrand’s technical expert, Dr. Japikse, admitted that he was unaware of any prior art surge control system with static pressure sensors in these locations. Remand Tr. at 348 (Japikse). Honeywell’s expert, Mr. Muller, likewise testified that the DELPQP flow parameter in the APS 3200 surge control system was not found in the prior art. Remand Tr. at 139-40 (Muller).

170. Sundstrand expert Japikse also admitted that the APS 3200’s use of inlet guide vane position to address the double-solution flow curve generated by the DELPQP flow-related parameter was the “first one [he] ever saw.” Remand Tr. at 361-62 (Japikse); *id.* at 144 (Muller).

171. Further, the only APU surge control system prior to 1982-83 that Japikse claimed exhibited a double-solution flow curve was the L1011. Remand Tr. at 355 (Japikse). As set forth in the Findings of Fact above, there was no credible, contemporaneous evidence that the L1011 produced a double-solution curve like the APS 3200. In any event, the pneumatic L1011 did not use inlet guide vane position in the surge control system. Remand Tr. at 341-42 (Japikse).

172. The admissions from Sundstrand's expert, as well as Mr. Muller's testimony, that the Sundstrand equivalent was a novel and unique solution to a particular problem associated with a surge control system developed years after the amendments at issue establishes that the equivalent would not have been foreseeable to one of ordinary skill in the art in 1982-83. The Supreme Court has expressly held that a patentee must only draft claims encompassing "**readily known**" equivalents. *Festo*, 535 U.S. at 740 (emphasis added). *See also Ranbaxy Pharm. Inc. v. Apotex, Inc.*, 350 F.3d 1235, 1241 (Fed. Cir. 2003) (equivalent not unforeseeable because it was "readily known").

173. The testimony of Dr. Japikse and Mr. Muller at the Remand trial establish that the equivalent surge control system was not "readily known" in 1982-83 as required by the Supreme Court and Federal Circuit and thus would not have been foreseeable.

174. This case stands in stark contrast to the vast majority of cases that have rejected patent owners' rebuttal arguments under the foreseeability prong. In nearly every case where equivalents have been found foreseeable, it has been because the equivalent was disclosed within the patent file itself. *See Glaxo Wellcome, Inc. v. Impax Labs, Inc.*, 356 F.3d 1348, 1355 (Fed. Cir. 2004) (patent owner submitted references to the Patent Office disclosing the equivalent); *Ranbaxy Pharm., Inc. v. Apotex, Inc.*, 350 F.3d 1235, 1241 (Fed. Cir. 2003) (equivalent

discussed in text of patent); *Sliptrack Sys., Inc. v. Steeler Metals, Inc.*, No. C-04-0462 PVT, 2004 WL 2323935, *9 (N.D. Cal. Oct. 12, 2004) (“[t]he very equivalent in question was disclosed in the specification as a ‘preferred method of assembly.’”); *Competitive Tech., Inc. v. Fujitsu Ltd.*, 333 F.Supp. 2d 858, 887 (N.D. Cal. 2004) (“it is clear from *the patent itself* that the inventors were not only aware that the timing of switching was a significant issue, but also that in the prior art” the equivalent was disclosed) (emphasis added); *see also Research Plastics, Inc. v. Federal Packaging Corp.*, 421 F.3d 1290, 1299 (Fed. Cir. 2005) (equivalent was disclosed in art that was subject of prosecution); *Pioneer Magnetics, Inc. v. Micro Linear Corp.*, 330 F.3d 1352, 1357 (Fed. Cir. 2003) (same); *Bio-Rad Labs, Inc. v. Applera Corp.*, No. C 02-05946 JW, 2005 WL 2008020, at *6 (N.D. Cal. Aug. 12, 2005) (same); *NPC, Inc. v. International Precast Supply, Inc.*, 337 F.Supp. 2d 378, 393 (D.N.H. 2004) (same); *Talbert*, 347 F.3d at 1359 (same).

175. Here, by contrast, the equivalent was not disclosed in the patent file and -- to the contrary -- did not exist anywhere in the prior art at the time of the amendments.

D. The L1011 APU Does Not Render The APS 3200 Surge Control System Foreseeable and, to the Contrary, Confirms that It Was Unforeseeable in 1982-83

176. Sundstrand relied heavily at the Remand trial on the L1011 APU as prior art, asserting that it was the closest piece of prior art to the APS 3200 surge control system. Remand Tr. at 314-15 (Japikse). Both of Sundstrand’s fact witnesses at the Remand trial, Brown and Telakowski, testified exclusively about the L1011 APU. In fact, however, the L1011 evidence confirmed that the Sundstrand equivalent was unforeseeable in 1982-83.

177. Sundstrand conceded that the L1011 APU represented the state-of-the-art for APU surge control systems in 1982-83 and that neither Sundstrand nor its customer, Lockheed, saw a need to upgrade the L1011 APU throughout the period of its manufacture through 1985. Remand Tr. at 429 (Telakowski).

178. Yet the surge control system of the L1011 APU differs from the equivalent APS 3200 surge control system in many important ways. These differences establish that if a person of ordinary skill in the art in 1982-83 had been guided by the state-of-the-art L1011 surge control system, that person would not have been able to foresee the APS 3200 surge control system.

179. To begin with, the L1011 APU does not measure inlet guide vane position as part of its surge control system. Remand Tr. at 341-42 (Japikse); *id.* at 380-81 (Brown); *id.* at 153-54 (Muller). Since the issue before the Court on Remand is the foreseeability of the Sundstrand equivalent surge control system and its use of inlet guide vane position, the fact that the state-of-the-art, allegedly closest prior art surge control system as of 1983 did not make *any* use of inlet guide vane position is very strong support for the conclusion of unforeseeability.

180. Moreover, the L1011 APU was designed with a pneumatic surge control system, which relies on the mechanical operation of valves and levers in response to pressure changes and has no electrical components. The APS 3200 surge control system, on the other hand, is a fully electronic system, which represents a significant technological advance over pneumatic systems. Remand Tr. at 342-43 (Japikse); *id.* at 152 (Muller). Asserted Claim 23 of the '893 patent, which the jury found infringed, specifically claims an *electronic* surge control system.

181. Still further, the L1011 surge control system shock switch was designed to completely disable the surge control system by dumping all air out to the atmosphere as soon as the system detected supersonic flow. Remand Tr. at 150-51 (Muller); *id.* at 294 (Japikse). But unlike the APS 3200's lock-out feature, the L1011's shock switch did not "give an indication of which side of [the] double valve function you were operating on." Remand Tr. at 400 (Brown). The APS 3200 surge control system, on the other hand, operates continuously throughout a supersonic condition, using inlet guide vane position to indicate which side of the double-

solution flow curve the load compressor is operating on and control for it. *Id.* at 143-44 (Muller). Moreover, the L1011 APU surge control system did not utilize inlet guide vane position in the operation of its shock switch. Remand Tr. at 340 (Japikse); *id.* at 153-54 (Muller).

182. What is more, the L1011 APU measures static pressure in four places all within the diffuser. Remand Tr. at 291 (Japikse); *id.* at 153 (Muller); DTX 399. The APS 3200 surge control system measures static pressure in only two places; once in the diffuser and once in a completely separate location in the discharge of the compressor. Remand Tr. at 153 (Muller); PTX 1018 ¶ 3; *see also* Remand Tr. at 347 (Japikse). Those two pressure measurements produce the unique flow related parameter DELPQP used on the APS 3200. PTX 1018 at ¶ 3; Remand Tr. at 129-32 (Muller).

183. In addition, the L1011 APU was designed to operate away from the surge point (Remand Tr. at 408 (Brown); *id.* at 338 (Japikse)), as opposed to APUs that utilized the patents-in-suit, like the APS 3200, which were designed to operate as near to the surge point as possible. Trial Tr. at 1666 (Shinsky).

184. Based on the evidence of both fact and expert witness testimony, as well as Sundstrand's business records, Honeywell has established that the state-of-the-art surge control system in 1982-83 was a (1) pneumatic system that (2) made no use of inlet guide vane position, (3) had no measure of static pressure outside of the diffuser and (4) was designed to cause the load compressor to operate far away from the surge point.

185. These prolific and fundamental differences between the APS 3200 surge control and the state-of-the-art L1011 surge control system -- the system Sundstrand claimed at Remand is the closest analogy to the 3200 system -- establish that the APS 3200 surge control system

would not have been “readily known” or foreseeable to one of ordinary skill in 1982-83. Instead, as a comparison to the 1982-83 state-of-the-art L1011 makes clear, the APS 3200 “was qualitatively different than what went before,” and was thus unforeseeable. *BEI Tech., Inc. v. Matsushita Elec. Indus. Co.*, 268 F.Supp.2d 782, 802 (E.D. Mich. 2003).

**E. The APS 3200 Surge Control System’s Long Development Period
Confirms That It Was Unforeseeable**

186. As set forth above in the Findings of Fact, it took Sundstrand nearly four years from first encountering the double-solution in the DELPQP flow related parameter in 1991 until Sundstrand developed the infringing equivalent solution in 1995. When the problem solved by the equivalent’s use of inlet guide vane position was encountered nearly a decade after the relevant amendment dates, it nonetheless took Sundstrand nearly four years to solve the problem and develop the equivalent. This long gestation period strongly supports the conclusion that a person of ordinary skill in the art would not have found that equivalent foreseeable in 1982-83. It is evident that the equivalent was not “readily known” (*Festo*, 535 U.S. at 740) or foreseeable to the engineers of ordinary (or greater) skill at Sundstrand and Turbomeca who worked on the APS 3200 surge control system in the early 1990s -- a full decade after the amendments at issue.

187. In the related context of obviousness, the Federal Circuit has held that difficulty in developing the infringing product is strong evidence of non-obviousness. *See, e.g., Advanced Display Systems, Inc. v. Kent State University*, 212 F.3d 1272, 1285 (Fed. Cir. 2000). In the obviousness context, the Federal Circuit has also held that an accused infringer’s failures in the design of a product that employed the patented technology is evidence suggesting nonobviousness. *Intel Corp. v. U.S. Int’l Trade Comm’n*, 946 F.2d 821, 835 (Fed. Cir. 1991). Evidence of failed attempts by another to develop the technology can even be determinative on

the issue of obviousness. *Advanced Display Systems, Inc. v. Kent State University*, 212 F.3d 1272, 1285 (Fed. Cir. 2000).

188. Courts have found that the parties' actual experience working with the technology is more powerful evidence than hindsight or hypothetical opinions provided by experts. "If people are clamoring for a solution, and the best minds do not find it for years, that is practical evidence--the kind that can't be bought from a hired expert, the kind that does not depend on fallible memories or doubtful inferences--of the state of knowledge." *In the Matter of Mahurkar Double Lumen Hemodialysis Catheter Patent Litigation*, 831 F.Supp. 1354, 1378 (N.D.Ill. 1993) (Easterbrook, J.), *aff'd* 71 F.3d 1573 (Fed. Cir. 1995) (citations omitted).

189. The undisputed evidence establishes that the first APU surge control system to use inlet guide vane position to deal with the problem created by a double-solution flow curve was the APS 3200. Remand Tr. at 361-62 (Japikse); *id.* at 144 (Muller). The undisputed evidence also establishes that when Sundstrand began designing the APS 3200 surge control system in 1989 -- some six years after the amendments at issue -- it was not even aware of the double-solution problem, and that Sundstrand then took until 1995 to design the equivalent system to deal with it. Trial Tr. at 1718 (Greubel); PTX 1018 at ¶¶ 13-14. This "practical evidence" confirms that the APS 3200 surge control system and its particular use of inlet guide vane position was not "readily known" in 1982-83.

F. Sundstrand's Attempt to Combine Disparate References With Hindsight to Recreate the Equivalent is Improper And Unavailing

190. While conceding that no piece of prior art discloses all elements of the APS 3200 equivalent system (Remand Tr. at 314, 348, 361-62 (Japikse)) and asserting that the L1011 is the closest piece of prior art (*Id.* at 314-15 (Japikse)), Sundstrand also put forward evidence that *some* of the *components* of the APS 3200 surge control system were known in 1982-83 and

argued from this proposition that the *system* was foreseeable. In total, Sundstrand relied on five different Honeywell APUs and more than a dozen articles and patents.

191. Each of the references relied upon by Sundstrand fails to disclose one or more of the key features of the equivalent APS 3200 surge control system. *See supra*. Sundstrand concedes this. Remand Tr. at 314-15, 348, 361-62 (Japikse) But while Dr. Japikse's overall approach was to mix and match alleged teachings from the various references that he cited, Sundstrand never provided any testimony as to why a person of ordinary skill in the art in 1982-83 would have been motivated to combine the various references Dr. Japikse found into the equivalent system. To the contrary, Honeywell established that a person of ordinary skill in the art would not have been motivated to combine such references. Remand Tr. at 137-39 (Muller). Without such a motivation to combine, the references cited by Sundstrand have no relevance to the foreseeability of the equivalent.

192. The prior art stew urged by Sundstrand fails the Supreme Court's test for foreseeability. The Supreme Court held that the expectation upon the patentee is to draft claims encompassing "*readily known* equivalents." *Festo*, 535 U.S. at 740 (emphasis added). The Federal Circuit has noted that even old technology is not always foreseeable for purposes of rebutting the presumption of prosecution history estoppel. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushki Co.*, 344 F.3d 1359, 1369 (Fed. Cir. 2003). *See also Smithkline Beecham Corp. v. Excel Pharm. Inc.*, 356 F.3d 1357, 1364 (Fed. Cir. 2004) ("The Supreme Court ties foreseeability to whether the applicant would have been expected *to know of*, and thus properly claim, the proposed equivalent at the time of the amendment.") (emphasis added). Even if all of the art cited by Sundstrand, taken in combination, taught the equivalent in question -- and it did not, because no reference showed the APS 3200's particular use of IGV position or the flow

related parameter DELPQP -- such a reconstruction of the invention from disparate prior art references could never satisfy the Supreme Court's requirement that the equivalent be "readily known."

193. Significantly, in the analogous obviousness context, the Federal Circuit has rejected reliance on ex post combinations of unrelated prior art and warned against the use of hindsight to reconstruct the claimed invention from the prior art. In the obviousness case law, the Federal Circuit has observed that "[m]ost inventions arise from a combination of old elements and each element may often be found in the prior art." *In re Kahn*, 441 F.3d 977, 986 (Fed. Cir. 2006) (citing *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998)). However, it is well-settled that the accused infringer "cannot pick and choose among the individual elements of assorted prior art references to recreate the claimed invention." *SmithKline Diagnostics, Inc., v. Helena Labs. Corp.*, 859 F.2d 878, 887 (Fed. Cir. 1988).

194. Instead, where a patent defendant seeks to rely on a combination of separate prior art references for purposes of obviousness, "[t]here must be a teaching or suggestion within the prior art, within the nature of the problem to be solved, or within the general knowledge of a person of ordinary skill in the field of the invention to look to particular sources, to select particular elements, and to combine them as combined by the inventor." *Crown Operations International, Ltd. v. Solutia Inc.*, 289 F.3d 1367, 1376 (Fed. Cir. 2002). See also *Pro-Mold and Tool Co., Inc. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996) (requiring inquiry into whether there is reason, suggestion or motivation to combine references of individual elements of the invention).

195. The requirement of a motivation or teaching to combine prior art references "protects against the entry of hindsight into the obviousness analysis, a problem which § 103 was

meant to confront.” *In re Kahn*, 441 F.3d 977, 986 (Fed. Cir. 2006) (citing 35 U.S.C. § 103) (stating that obviousness must be assessed “at the time the invention was made”); *In re Dembiczak*, 175 F.3d 994, 998 (Fed. Cir. 1999) (“[I]t is this phrase that guards against entry into the tempting but forbidden zone of hindsight.”)

196. In precisely the same way, the Supreme Court and Federal Circuit have guarded against “the tempting but forbidden zone of hindsight” from entering the foreseeability analysis by specifying that the inquiry is an objective one, “asking whether the alleged equivalent would have been unforeseeable to one of ordinary skill in the art *at the time of the amendment*.” *Festo*, 344 F.3d at 1369 (emphasis added); *see also Festo*, 535 U.S. at 740.

197. Sundstrand proffered no evidence of what would have caused someone of ordinary skill in the art in 1982-83 to assemble the disparate pieces of prior art it has offered to form the equivalent system. Instead, Sundstrand offered only the conclusory testimony of Dr. Japikse, who professed an ignorance of the applicable law, and who admitted that he simply went out and searched for individual pieces of prior art to demonstrate specific components of the equivalent system. Remand Tr. at 312-13 (Japikse). Without proof by Sundstrand of a contemporaneous motivation to combine, its reliance on the various prior art references fails.

198. By contrast, Honeywell expert Muller expressly addressed the motivation issue and testified that one skilled in the art in 1982-83 would have had no motivation to assemble the known art in the manner of the equivalent system, since there were many reliable flow measurement devices available “off-the-shelf,” such as pitot tubes and Venturi flow devices. Remand Tr. at 137-39 (Muller).

199. Sundstrand’s reliance on the deposition testimony of Honeywell engineer Jim Clark is similarly unpersuasive. Mr. Clark’s acknowledgment that he “knew [about] shock

waves and pressure drops” when he was in college does not render Sundstrand’s equivalent foreseeable. Remand Tr. at 107 (Sundstrand Opening St.) (quoting Clark Dep.). Nor does Clark’s supposition that if faced with the double-solution problem in the 1970s -- *which it was not* -- Honeywell would have solved the problem the same way it did in the 1990s. The fact that Honeywell might have solved a problem the same way if it had been faced with it 20 years earlier does not mean that the solution itself was foreseeable 20 years earlier. For the same reason, Mr. Muller’s 2000 declaration (DTX 349 at ¶ 34), in which he confirms -- based on his knowledge in 2000 -- that any compressor taking static pressure measurements of supersonic air flow in the diffuser would have a double-solution does not render the equivalent foreseeable. Remand Tr. at 106-07 (Sundstrand Opening St.). The statements of Mr. Clark and Mr. Muller -- just like Sundstrand’s broader foreseeability argument -- rely on hindsight. The fact that engineers *now* know how and why the double-solution arises does not render Sundstrand’s novel use of inlet guide vane position in response to that double-solution foreseeable in 1982-83.

200. Likewise, Sundstrand’s reliance on Mr. Muller’s statement in his 2000 declaration that the “‘inverted-V/double solution’ characteristic in the APS 3200 ... has nothing to do with whether the APS 3200 uses the technology in the ‘893 and ‘194 patents” is misplaced. Sundstrand Trial Br. at 11 (citing DTX 349 at ¶ 34). Mr. Muller is correct that the presence of the double-solution curve is not what determines whether the APS 3200 -- or any other surge control system -- infringes the patents-in-suit; rather, it is the response to such issues and, in particular, the use of inlet guide vane position that determines infringement. Indeed, of the Honeywell APU surge control systems that embody the patents-in-suit, some experience the double-solution flow curve and others do not. *Compare* Honeywell Resp. to Sundstrand’s First

Set of Interrogatories on Remand at Resp. No. 7 to Honeywell's Second Supp. Resp. to Sundstrand's First Set of Interrogatories at Resp. No. 5.

201. The undisputed evidence establishes that those skilled in the art did not manage, or have the motivation, to combine the prior art Sundstrand relies on to design the equivalent system at the time of the amendments. PTX 1018 at ¶¶ 13-14.

G. Sundstrand's Attempt To Redefine the Equivalent Fails

202. Sundstrand's final argument is that "the equivalent" from the 2001 trial was any use of "inlet guide vane position to efficiently control surge" or any "flow-related parameter [that is] a direct function of the inlet guide vane position." Remand Tr. at 48 (Sundstrand Opening St.). The Court need not tarry long on this argument.

203. Sundstrand mischaracterizes this Court's previous decision by misleadingly quoting only an isolated portion of the opinion. *See* Remand Tr. at 96-97 (Sundstrand Opening St.). While the Court did state in its ruling on the parties' post-trial motions that "[t]he flow-related parameter used by the APS 3200, DELPQP, was a direct function of inlet guide vane position," *Honeywell Int'l Inc. v. Hamilton Sundstrand Corp.*, 166 F.Supp.2d 1008, 1021 (D.Del. 2001), that language did not purport to define the equivalent. Instead, the Court made clear in its opinion that "Honeywell set forth competent evidence from which a jury could reasonably conclude that *the way the APS 3200 uses inlet guide vane position* is insubstantially different from the way inlet guide vane position is used in the patent claims." 166 F.Supp.2d at 1021 (emphasis added). *See also id.* at 1024 ("[T]he court finds that Honeywell presented substantial, sufficiently particularized testimony comparing the elements of the APS 3200 to the elements of the patents-in-suit."). In fact Sundstrand itself in its JMOL brief, in a section entitled "Honeywell's Equivalence Argument," argued that "[a]t trial, Honeywell attempted to demonstrate through the function-way-result test that *the high flow logic of the APS 3200*

satisfied by equivalence the limitations in Honeywell’s patent claims that require a particular use of inlet guide vane position.” D.I. 275 at 9 (emphasis added).

204. As these quotes from 2001 make clear, it was the APS 3200 surge control system and its specific use of inlet guide vane position that was found by the jury to infringe the Honeywell patents. Honeywell presented particularized and extensive evidence and testimony to the jury regarding the Sundstrand APS 3200 surge control system’s unique DELPQP flow-related parameter and its particular use of inlet guide vane position as part of the high-flow logic test. *See, e.g.*, Trial Tr. at 616-35, 638-76, 681-718, 730-60 (Muller); *id.* at 1328-30, 1332-69, 1379-1401, 1404-25, 1559-94 (Shinsky). Mr. Muller described the design and operation of the APS 3200 surge control system in great detail, including the APS 3200’s DELPQP flow-related parameter and its use of IGV position to determine whether the system is in high flow or low flow. *See, e.g.*, Trial Tr. 616-635, 638-76, 681-718, 730-60 (Muller). During closing arguments, Honeywell’s counsel emphasized to the jury that the limitations of the patent claims were met because “the APS 3200 surge control system insures that it does not go into low-flow mode when it actually should be in high-flow mode” by “measuring the position of the inlet guide vanes” (Trial Tr. at 2551), and it is that surge control system that the jury decided infringed the Honeywell patents under the doctrine of equivalents. *See* Special Verdict Form (D.I. 264). *Accord Festo*, 344 F.3d at 1371 (equivalent evaluated under rebuttal criteria is particular embodiment of accused product).

H. Conclusion Regarding Unforeseeability

205. Based on the Court’s conclusion that it would have been unforeseeable to one of ordinary skill in the art in 1982-83 to design a surge control system with the unique features of the APS 3200, Honeywell has successfully rebutted the presumption of prosecution history estoppel under *Festo*. 344 F.3d at 1369. Because a patentee is only “expected to draft claims

encompassing readily known equivalents,” *Festo*, 535 U.S. at 740, and the evidence established that the Sundstrand infringing equivalent was not readily known, Honeywell could not have drafted a claim that literally covered the equivalent (*Festo*, 344 F.3d at 1372).

206. Sundstrand’s experts at both the 2001 jury trial and the 2006 Remand trial admitted that the Sundstrand equivalent uses a unique flow related parameter that necessitated a novel use of inlet guide vane position, neither of which was known in the art at the time of the amendments. None of the prior art references Sundstrand points to, including the state-of-the-art L1011, contain the key features of the APS 3200 surge control system, and Sundstrand offered no evidence as to why one of reasonable skill in the art in 1982 would have been motivated to combine the disparate references it points to. Where, as here, the equivalent at issue is “qualitatively different than what went before,” it was “not foreseeable at the relevant time” and the patent holder “is not estopped from arguing infringement by the doctrine of equivalents.” *BEI Tech., Inc.*, 268 F.Supp.2d at 802.

III. The Rationale For The Amendments Bears No More Than A Tangential Relation To The Equivalent

207. As a separate basis for reinstating the jury’s infringement verdict, the Court also finds that Honeywell proved rebuttal of the *Festo* presumption under the “tangential relation” test.

A. Law Governing Tangential Relation Inquiry

208. The “tangential relation” prong of the *Festo* rebuttal test focuses on whether “the rationale underlying the amendment [] bear[s] no more than a tangential relation to the equivalent in question.” *Festo*, 535 U.S. at 740.

209. The focus of the tangential relation test is on the *reason* for the narrowing amendment. *Festo*, 344 F.3d at 1369-70. The test “asks whether the reason for the narrowing

amendment was peripheral, or not directly relevant, to the alleged equivalent.” *Festo*, 344 F.3d at 1369.

210. The inquiry “focuses on the patentee’s objectively apparent reason for the narrowing amendment,” a reason which, “should be discernible from the prosecution history record.” *Festo*, 344 F.3d at 1369.

211. The underlying purpose of the amendment can often be determined based on the prior art that the amendment was made to avoid. *See, e.g., Biagro Western Sales, Inc. v. Grow More, Inc.*, 423 F.3d 1296, 1306 (Fed. Cir. 2005); *Engineered Prod. Co. v. Donaldson Co., Inc.*, 313 F.Supp. 2d 951, 973 (N.D. Iowa 2004).

212. Because prosecution history estoppel is designed to prevent a patentee from regaining territory through an infringement action that he voluntarily surrendered during prosecution, an amendment made for a reason unrelated or only peripherally related to the equivalent does not trigger the doctrine. *Festo*, 535 U.S. at 734.

213. Where a patentee demonstrates that the rationale underlying an amendment bears no more than a tangential relation to the equivalent, “the amendment cannot reasonably be viewed as surrendering [that] particular equivalent.” *Festo*, 535 U.S. at 740. In such circumstances, the presumption is rebutted, and the full range of equivalents is available to the patentee.

214. The tangential relation prong of the *Festo* rebuttal analysis “is for the court to determine from the prosecution history record without the introduction of additional evidence.” *Festo*, 344 F.3d at 1370.

B. The Rationale For the Amendments Bears No More Than a Tangential Relation to the Equivalent

215. According to the Federal Circuit’s decision in this case, the relevant narrowing amendments took place on October 25, 1982 (as to the ‘893 patent) and September 1, 1983 (as to the ‘194 patent) when Honeywell responded to the Examiner’s office actions by canceling rejected independent application claims 16, 32 and 48 and rewriting dependent application claims 17, 35 and 51 in their place. *See Honeywell Int’l Inc.*, 370 F.3d at 1134; JTX 33 at HSB 401570, HSB 401573; JTX 31 at HSB 401461, HSB 401466, HSB 401472.

216. The objectively apparent reason for the amendments at issue was to include additional limitations from the original dependent claims in order to overcome prior art that had nothing to do with inlet guide vanes but rather disclosed a surge control system with P and Delta P sensors and proportional and integral control. JTX 33 at HSB 401566-5677; JTX 31 at HSB 401456-401458.

217. The “particular equivalent in question,” is the specific method and apparatus that the jury found infringed the Honeywell patents-in-suit, namely the Sundstrand APS 3200 surge control system with its unique DELPQP flow-related parameter and its particular use of inlet guide vane position as part of the high flow logic. Trial Tr. at 1335 (Shinskey); *id.* at 2598-2599 (Sundstrand Closing St.); *id.* at 626-28 (Muller).

1. The Equivalent Was Not In the Prior Art Before the Examiner

218. It is undisputed that none of the prior art that was before the Examiner during prosecution (i) featured Sundstrand’s “unique” DELPQP flow parameter, (ii) made any use of inlet guide vane position as part of the surge control system, or (iii) bears any relation to the infringing Sundstrand system. Sundstrand admitted “that during the prosecution of the Patents-

in-Suit, the Examiner did not reference any Prior Art that disclosed inlet guide vanes or the use of their position as part of a surge control system.” PTX 1021 at No. 5.

219. While this factor is not, by itself determinative, *see Chimie v. PPG Indus. Inc.*, 402 F.3d 1371, 1383 (Fed. Cir. 2005), it is nonetheless highly persuasive evidence that the reason for the amendment was no more than tangentially related to the equivalent. *See Cordis Corp. v. Medtronic Ave., Inc.*, 336 F.Supp.2d 363, 369-70 (D. Del. 2004) (Robinson, C.J.) (discussing fact that equivalent did not appear in prior art in reaching conclusion that reason for amendment bore no more than a tangential relation to the equivalent). In stark contrast to this case, in *Chimie*, the equivalent was *at issue* during prosecution and therefore the narrowing amendment could not be said to be tangential. *Chimie*, 402 F.3d at 1383 (“the relative dustiness of [Chimie’s] invention was at issue during prosecution.”).

220. Here, by contrast, the rejections that precipitated Honeywell’s amendments were based on the Shell, Rateau, Metot and Lewis references, which the Examiner found disclosed surge control systems for a gas turbine engine with P and ΔP sensors and proportional and integral controls as claimed by the independent application claims. JTX 33 at HSB 401566-567; JTX 31 at HSB 401456-457. None of the references that occasioned the amendments bears any relation to the infringing Sundstrand system. In particular, none uses Sundstrand’s unique DELPQP flow parameter and none made any use of inlet guide vane position as part of the surge control system. JTX 29, PTX 1015, PTX 1006, JTX 28.

221. Whether prior art *not* considered during the patent examination contained any reference to inlet guide vane position is irrelevant to the “tangential relation” inquiry, which focuses exclusively on the art before the Examiner and applicant during prosecution. *Festo*, 344 F.3d at 1370.

2. Additional Features Beyond IGV Position Were Added By The Amendments

222. The prosecution history of the Honeywell patents-in-suit contains further confirmation that the rationale behind the amendments was unrelated to the Sundstrand equivalent. For example, at no point during the prosecution of the patents-in-suit did either Honeywell or the Examiner attach any significance to, or even mention, the claimed use of inlet guide vane position.

223. Not only did the Examiner not mention inlet guide vane position, but his actions establish that he attached no particular significance to that feature of the inventions. For example, in the same Office Action in which the Examiner indicated that application claims 17 and 35 (containing inlet guide vane use) would be allowed if rewritten in independent form, the Examiner also indicated that application claims 14, 30 and 33 (which became Claims 6, 17 and 18 of the '893 patent) would be allowed if rewritten in independent form, even though those claims contained no inlet guide vane position limitation at all. JTX 31 at HSB401462, HSB401465, HSB401469-471. Significantly, the independent claims on which application claims 17, 35, 14, 30 and 33 depended were all rejected over the same art disclosing a surge control system with proportional and integral control and $\Delta P/P$ sensors. JTX 31 at HSB401456-457. The fact that application claims 14, 30 and 33 were also allowed makes it evident that inlet guide vane position was not the focus of the prosecution or the key to patentability.

224. Moreover, as detailed above in the Findings of Fact, in the relevant amendments Honeywell added a number of additional limitations to the asserted claims in addition to the use of inlet guide vane position. For example, in what became Claim 8 of the '893 patent, the Honeywell amendment at issue added, in addition to the limitation of "reset signal for varying said set point as a function of the position of said inlet guide vanes," the logically and functionally separate and distinct limitations that the surge control system contain 1) a flow-

related parameter whose value is “substantially independent of the temperature of the compressed air;” 2) a comparator means having an “adjustable control set point representing said desired value of said parameter;” and 3) a “predetermined reset schedule.” JTX 31 at HSB 401466-67.

225. The amendments to Claim 19 of the ‘893 patent and Claim 4 of the ‘194 patent also added more elements than just the use of inlet guide vane position. JTX 31 at HSB 401472; JTX 33 at HSB 401573.

226. This history shows that not only was the rationale for the amendments completely unrelated to the Sundstrand infringing equivalent -- which did not exist at the time, and did not appear in the prosecution file -- but also that the rationale was not even to add some type of use of inlet guide vane position. Instead, Honeywell’s rationale was to add various additional elements to the rejected original independent claims to overcome the prior art cited by the Examiner and thereby obtain allowance.

227. Contrary to Sundstrand’s argument, the Federal Circuit did not hold that inlet guide vane use was the only limitation added during the amendments. While the Federal Circuit did find that Honeywell “effectively add[ed] the inlet guide vane limitation” to the claims, 370 F.3d at 1144, it never held that inlet guide vane use was the *only* element added to the claims, and the foregoing discussion of the prosecution history establishes that it was not.

228. The Examiner never suggested that the amended claims were allowable because they claimed a particular use of inlet guide vane position, or even because they mentioned inlet guide vane position at all. Indeed, inlet guide vane position was never mentioned at any point in the prosecution history, either by the Examiner or by Honeywell. JTX 33, 31. The amended claims were not allowed because of the addition of inlet guide vane position alone, but because

of the addition of all the added features together. The prosecution history establishes that the reason for the amendments is no more than tangentially related to the equivalent.

3. The Reason for Honeywell's Amendments Is Not Unexplained

229. Sundstrand's argument that Honeywell cannot establish rebuttal under the tangential relation prong because it did not give a reason for the amendments is not persuasive for several reasons. Remand Tr. at 49-50 (Sundstrand Opening St.).

230. First, *Festo* does not require a patentee to state explicitly the reason for an amendment, but rather compels a court to examine the prosecution history and the "context in which the amendment was made" in order to determine the "objectively apparent reason" for the amendment. *Festo*, 344 F.3d at 1369-70. As set forth above, the Court has done that and concludes that the rationale for Honeywell's amendments is apparent from the prosecution and is unrelated to the Sundstrand equivalent.

231. Moreover, the *en banc* Federal Circuit has expressly rejected the rule pressed for by Sundstrand, that "unexplained" amendments necessarily lead to estoppel. In *Festo*, the Federal Circuit rejected the argument that "Festo is completely barred from relying on the doctrine of equivalents for the 'magnetizable' amendment because it was 'unexplained,'" holding that "Festo is entitled to attempt to rebut the presumption of surrender for the 'magnetizable' amendment" even though it was an "'unexplained' amendment." *Festo*, 344 F.3d 1359, 1371 n.5. Thus, even if Honeywell's amendments were "unexplained" -- which they are not -- Honeywell would still be entitled to rebut the *Festo* presumption by demonstrating the "objectively apparent reason" for the amendments. *Festo*, 344 F.3d at 1369-70.

232. Further, the Court rejects Sundstrand's argument that this result advocates a rule whereby "the less you say in the prosecution, the better off you are." Remand Tr. at 60 (Sundstrand Opening St.). The reason for Honeywell's amendments is apparent both from the

actions that were taken and from the words that were written by the patentee and the Examiner. The public notice function of a patent and its prosecution history is therefore protected. *Festo*, 344 F.3d at 1369-70.

C. Sundstrand Improperly Focuses on the Subject Matter of the Amendments

233. Sundstrand argued that the reason for the amendment was to “add[] the IGV limitation to overcome prior art.” Sundstrand Trial Br. (D.I. 396) at 24; *see also* Remand Tr. at 52 (Sundstrand Opening St.). However, this argument improperly conflates the *subject matter* of the amendments with the *reason* for making the amendments. Under *Festo*, the tangential relation inquiry focuses on the reason for the amendments. 344 F.3d at 1369.

234. The fallacy of Sundstrand’s argument was identified by Chief Judge Robinson in *Cordis Corp. v. Medtronic Ave., Inc.*, 336 F. Supp. 2d 363, 368 (D. Del. 2004). In *Cordis*, the defendants argued that “‘a narrowing amendment will not be considered to be tangentially related if the disputed limitation was ‘directly at issue’ during prosecution’” and if “these same limitations are ‘at issue’ in this litigation.” *Id.* In rejecting this argument as a matter of law, Chief Judge Robinson explained:

By focusing on ‘whether the amendment itself narrows the scope of the claim in a way that affects the equivalent[s] in question,’ defendants are making superfluous the tangential exception to the presumptive bar imposed under *Festo* [since] ‘If this were the test, it would be an impossible one -- the only reason why the dispute arises is because the equivalent is related to the amendment and thereby affected.’

336 F.Supp.2d at 369-70. Sundstrand’s argument must be rejected for the same reasons.

235. Sundstrand criticizes the *Cordis* decision by asserting that Chief Judge Robinson makes the inappropriate connection that an equivalent is tangential because it is not in the prior art. Remand Tr. at 78 (Sundstrand Opening St.) citing *Cordis Corp. v. Medtronic Ave., Inc.*, 336

F.Supp.2d 363 (D.Del. 2004). But Sundstrand mischaracterizes the court's holding in *Cordis*. In *Cordis*, Chief Judge Robinson found that "the reason the amendments were submitted was to distinguish a prior art device that [was] only tangentially related to the inventive or accused devices." 336 F.Supp.2d at 370. Judge Robinson did not conclude that the amendment was tangential merely because the equivalent was not in the prior art. In fact, Judge Robinson concluded that the structure found in the prior art was the "antithesis" of the equivalent structures at issue. *Id.*

D. *Insituform* Confirms That The Tangential Relation Criteria Is Satisfied Here

236. In *Insituform Tech., Inc. v. CAT Contr., Inc.*, 385 F.3d 1360, 1368 (Fed. Cir. 2004), the Federal Circuit held that the *Festo* presumption had been rebutted under the tangential relation prong. The Court finds that the Federal Circuit's decision in *Insituform* is squarely on point and supports the conclusion of a similar rebuttal here.

237. In *Insituform*, as here, the Federal Circuit held that there had been a narrowing amendment based on the addition of a claim limitation when a broader independent claim was canceled in favor of a narrower, originally dependent one. Claim 1 of *Insituform*'s patent for an underground pipe repair method had originally not specified the number of cups that could be used to create a vacuum, but during prosecution the patentee replaced the broad, unlimited claim with a narrower claim that specified that a single cup would be used. *Insituform*, 385 F.3d at 1366. The process that was found to infringe under the doctrine of equivalents used multiple cups to create the vacuum. *Id.* at 1365-66.

238. The Federal Circuit concluded that the reason the amendment had been made was to distinguish the invention from prior art that involved the placement of a compressor, not the number of cups used to create the vacuum, and that there was "no indication in the prosecution history of any relationship between the narrowing amendment and a multiple cup process, which

is the alleged equivalent in this case.” *Id.* at 1370. Accordingly, the *Festo* presumption was rebutted. *Id.* at 1370-71.

239. The prosecution history at issue in *Insituform* tracks that of Honeywell’s patent prosecution almost precisely. The original independent claims all lacked the element at issue in the later equivalents dispute -- in the case of *Insituform*, cups; in the case of Honeywell, inlet guide vane position. See *Insituform*, 385 F.3d at 1368-70; JTX 33 at HSB 401556; JTX 31 at HSB 401434, HSB 401439-40.

240. During prosecution, in both cases the independent claims were rejected, canceled and replaced by narrower, formerly dependent claims that contained a version of the element at issue -- in the case of *Insituform*, a single-cup process; for Honeywell, a particular use of inlet guide vanes. See *Insituform*, 385 F.3d at 1366; JTX 33 at HSB 401570, HSB 401573; JTX 31 at HSB 401461, HSB 401466, HSB 401472.

241. In both cases the amendments were made to overcome prior art, and in each case the prior art being avoided did not include the element in the dependent claim that was effectively added to the broad independent claim. In the case of *Insituform* the prior art being avoided related to the location of the compressor while the added limitation concerned the number of cups. 385 F.3d at 1369-70. In Honeywell, the prior art being avoided concerned a flow-related parameter subjected to proportional and integral control while the added limitations included a reference to inlet guide vane position. JTX 33 at HSB 401566-567, HSB 401573; JTX 31 at HSB 401456-57, HSB 401466, HSB 401472.

242. In each case the infringer used a variation of the element that had been added -- in *Insituform*, a multi-cup process; in Honeywell, inlet guide vane position to deal with a unique

flow parameter. *Insituform*, 385 F.3d at 1365; Remand Tr. at 144 (Muller); *id.* at 361-62 (Japikse).

243. Just as the Federal Circuit held in *Insituform* that there was no more than a tangential relationship between the amendment and the equivalent because “[t]here is no indication in the prosecution history of any relationship between the narrowing amendment and a multiple cup process, which is the alleged equivalent in this case,” 385 F.3d at 1370, Honeywell has successfully rebutted the presumption because there is no indication in the prosecution history here of any relationship between the narrowing amendments and the Sundstrand equivalent use of IGV position.

244. Sundstrand argues that *Insituform* actually supports its position because “what you had in *Insituform* was specific explanation by the patentee over and over and over again of what the reason was behind its amendment and why it was completely unrelated to the limitation or the equivalence arguments that the plaintiff was making.” Remand Tr. at 79 (Sundstrand Opening St.). But the explanation that Sundstrand points to in *Insituform* was the patentee’s explanation for its separate amendment of moving the location of the vacuum source; the patentee never explicitly articulated any reason for adding the limitation at issue -- the single cup process. 385 F.3d at 1369-70. Nevertheless, because the prior art in response to which the amendment was made did not contain any mention of a single (or multi-cup) process, the court concluded that there was “no indication in the prosecution history of any relationship between the narrowing amendment and a multiple cup process, which is the alleged equivalent in this case.” *Id.* at 1370. For the same reason, because the prior art that prompted the amendments in this case did not contain any mention of the equivalent or even any type of inlet guide vane position use, there is “no indication in the prosecution history of any relationship between the

narrowing amendment[s]” and the equivalent, and therefore no more than a tangential relation between the reason for the amendments and the Sundstrand equivalent.

E. The Other Relevant Case Law Similarly Supports The Court’s Result

245. In contrast to cases like *Insituform*, in the typical case where the “tangential relation” test has been held not satisfied, it is because the equivalent was in the prior art before the Examiner and therefore bore a direct relationship to the narrowing amendment.

246. For example, in *Talbert Fuel Sys. Patents Co. v. Unocal Corp.*, 347 F.3d 1355 (Fed. Cir. 2003), the original application claimed a type of gasoline fuel with particular hydrocarbon mixtures but without any specification of the boiling point of the fuel. *Id.* at 1358. The Examiner rejected the claim based on a reference showing gasoline fuel with the claimed hydrocarbon mixtures and a boiling point between 390 and 420 degrees. *Id.* In response, the applicant amended the claim to add a limitation that the claimed fuel had a boiling point between 121 and 345 degrees. *Talbert*, 347 F.3d at 1358. The amended claim issued. The accused product had boiling points at 374 degrees and above. The Federal Circuit held that the patentee could not meet the tangential relationship test and assert that the accused product was equivalent because “the boiling range [was] at issue during prosecution and [was] the direct, not tangential, reason for the narrowing amendments to these claim limitations.” *Talbert*, 347 F.3d at 1360.

247. In this case, by contrast, the Examiner’s rejection had nothing to do with the use of inlet guide vane position, and none of the prior art considered during prosecution related to inlet guide vane position. Here it is not the case, as it was in *Talbert Fuel*, that the prior art “embraced the alleged equivalent,” or that the use of inlet guide vane position was “at issue during prosecution and was the direct reason for the narrowing amendment.” PTX 1021 at Resp. No. 5; JTX 33 at HSB 401456-457; JTX 31 at HSB 401566-567.

248. None of the other tangential relation cases Sundstrand cited are on point. In *Festo*, the patentee amended the claims at issue in response to a rejection under 35 U.S.C. § 112 where the limitation at issue was directly related to the equivalent. *See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558, 583 (Fed. Cir. 2000). The patentee added the following limitation: “a cylindrical sleeve be made of a *magnetizable* material.” *Festo*, 344 F.3d at 1371 (emphasis in original). Significantly, the equivalent at issue was a “*nonmagnetizable* aluminum sleeve.” *Id.* The Federal Circuit held that the patentee failed to show that the rationale underlying the amendment was merely tangential to the equivalent. *Id.* at 1372

249. This case is distinct from *Festo*. In *Festo*, the Examiner noted that he could not determine whether the device was a “magnetic clutch.” In response, the applicant amended the claim to add the “magnetizable” limitation. Therefore, in *Festo*, the rationale for adding the limitation was directly related to the equivalent in question -- a *nonmagnetizable* sleeve. 344 F.3d at 1371. However, in this case, neither the Examiner, the prior art nor the patentee placed the inlet guide vane limitation in issue during prosecution. Furthermore, the prosecution history demonstrates that the guide vane limitation was not necessary to render the claim at issue patentably distinct over prior art that did not contain that element. This is evident because the prosecution history is completely void of any discussion related to inlet guide vane usage. PTX 1021 at Resp. No. 5; JTX 31, 33. Instead, Honeywell incorporated the guide vane limitation in addition to other limitations merely to respond to the Examiner’s suggestion that the dependent claims be rewritten into independent form, and a number of claims with no inlet guide vane limitation at all also issued. JTX 31 at HSB401458; JTX 33 at HSB401567. Accordingly, here, unlike in *Festo*, the rationale underlying the amendment was tangential to the equivalent in question.

250. Sundstrand cites *Biagro*, *Windbrella* and *eSpeed* for the proposition that where the patentee fails to state a reason for amending the claim, the amendment cannot be merely tangential. Remand Tr. at 55-59 (citing *Biagro Western Sales, Inc. v. Grow More, Inc.*, 423 F.3d 1296 (Fed. Cir. 2005); *Windbrella Products Corp. v. Taylor Made Gold Company, Inc.*, 414 F.Supp.2d 305 (S.D.N.Y. 2006); *eSpeed, Inc. v. Brokertec USA, L.L.C.*, 342 F.Supp.2d 244 (D.Del. 2004)). None of these decisions is controlling here.

251. In the first place, to the extent that Sundstrand's reading of *Biagro*, *Windbrella* and *eSpeed* is inconsistent with the Federal Circuit's *en banc* decision in *Festo*, the *Festo en banc* decision controls. As noted above, the *en banc* Federal Circuit has rejected the argument that an "unexplained" amendment bars application of the doctrine of equivalents. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., LTD.*, 344 F.3d 1359, 1371 n. 5 (Fed. Cir. 2003) (*en banc*) (citing *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., LTD.*, 535 U.S. 722, 740 (2002)) (rejecting the infringer's argument that the patentee is barred "from relying on the doctrine of equivalents for the 'magnetizable' element because that amendment was 'unexplained'"). Therefore, Sundstrand's purported reading of *Biagro*, *Windbrella* and *eSpeed* is not controlling and the Court must look to the objectively apparent reason for the amendments. *Festo*, 344 F.3d at 1369.

252. Moreover, as found by the Court above, the reason for the amendment here is not unexplained but rather readily apparent from the face of the prosecution history. Accordingly, none of these other cases cited by Sundstrand is applicable to the facts present here.

253. Furthermore, in *Windbrella*, the patentee amended the claims at issue to include "said latch being ring shaped..." in order to distinguish the prior art. *Windbrella Products Corp. v. Taylor Made Golf Company, Inc.*, 414 F.Supp.2d 305, 319 (S.D.N.Y. 2006) ("In this case, the

amendment clearly concerned the latch at issue in this litigation, and there is no explanation of this amendment in the record that would make its shape irrelevant.”).

254. *Windbrella* is distinct from this case for a number of reasons. Foremost, unlike in the *Windbrella* case, the prior art cited against Honeywell’s patent applications did not contain the equivalent at issue. Secondly, in *Windbrella*, the amendment added the limitation at issue specifically to address the prior art rejection. 414 F.Supp.2d at 319. The patentee in *Windbrella* amended the claim to define the characteristics of the “latch,” thereby rendering the claim patentably distinct over prior art that also contained a latch. *Id.* In this case, however, Honeywell incorporated the guide vane limitation in addition to other limitations merely to respond to the Examiner’s suggestion to rewrite the dependent claims rather than, as in *Windbrella*, to define better the characteristics of that particular guide vane limitation in the context of the prior art. Accordingly, the rationale underlying the amendment was unrelated to the guide vane limitation and therefore tangential to the equivalent at issue.⁴

255. In *Biagro*, the patentee amended the claims at issue by adding the limitation “acid or salt thereof is present in an amount of about 30 to about 40 weight percent.” *Biagro Western Sales, Inc. v. Grow More, Inc.*, 423 F.3d 1296, 1306-07 (Fed. Cir. 2005) (noting that the amendment was made to overcome a rejection based on the concentration of a composition). Furthermore, the patentee explicitly argued that the claims were distinguishable over the prior art because of the particular concentration of the claimed compositions. *Biagro*, 423 F.3d at 1306.

⁴ In *eSpeed*, the court found that the amendment was directly related to the Examiner’s rejection. *eSpeed, Inc. v. Brokertec USA, L.L.C.*, 342 F.Supp.2d 244, 252 (D. Del. 2004) (“The applicants’ rationale in amending the ‘526 application appears to be directly related to overcoming the examiner’s first rejection.”). However, the court did not discuss the features of the equivalent or prior art or the basis for the Examiner’s rejection of the claims. Accordingly, the case does not provide support for Sundstrand’s position.

In doing so, the patentee expressly put at issue the very limitation that was later the subject of the equivalents dispute. Here, Honeywell never argued during prosecution that the guide vane limitation itself distinguished the amended claim over the prior art. Moreover, Honeywell never highlighted the guide vane limitation as a required limitation that rendered the claims patentably distinct.

F. Conclusion Regarding Tangential Relation

256. The file wrapper reveals that the reason for the amendments was to include additional limitations from the original dependent claims in order to overcome prior art that had nothing to do with inlet guide vanes but rather disclosed a surge control system with P and Delta P sensors and proportional and integral control -- a reason that is unrelated and tangential to the subject matter of the Sundstrand infringing equivalent. This conclusion is further supported by the facts that (1) each asserted claim includes other, non-inlet guide vane limitations added by the same amendment, (2) the Examiner made no reference to inlet guide vane usage, (3) none of the art cited showed use of or even discussed inlet guide vanes, and (4) the Examiner allowed numerous other claims that did not include the inlet guide vanes.

257. The prosecution history record thus establishes that the rationale for the Honeywell amendments bore no relationship to the equivalent APS 3200 surge control system, including its particular use of inlet guide vane position. Honeywell has therefore established that there is no more than a tangential relation between the amendments and the equivalent. Honeywell has successfully rebutted the *Festo* presumption on this basis as well.

IV. "Other Reasons"

258. On March 22, 2006, the Court granted in relevant part Sundstrand's motion *in limine* relating to certain evidence that Honeywell sought to introduce relating to the "other reasons" prong of the *Festo* rebuttal analysis. (D.I. 405.) In response, Honeywell made a proffer

on March 23, 2006 of the “other reasons” evidence it had been prepared to present but for the Court’s ruling. Remand Tr. 3-4. Honeywell has preserved its ability to appeal the Court’s March 22 ruling.

CONCLUSION

259. Honeywell has rebutted the *Festo* presumption on both the “unforeseeability” and the “tangential relation” bases specified by that case. Accordingly, the jury was properly charged on the doctrine of equivalents, and the jury’s February 16, 2001 verdict of infringement is hereby reinstated.

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April 28, 2006
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CERTIFICATE OF SERVICE

I hereby certify that on April 28, 2006, I electronically filed the foregoing document with the Clerk of Court using CM/ECF, which will send notification of such filing to Richard D. Kirk.

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